

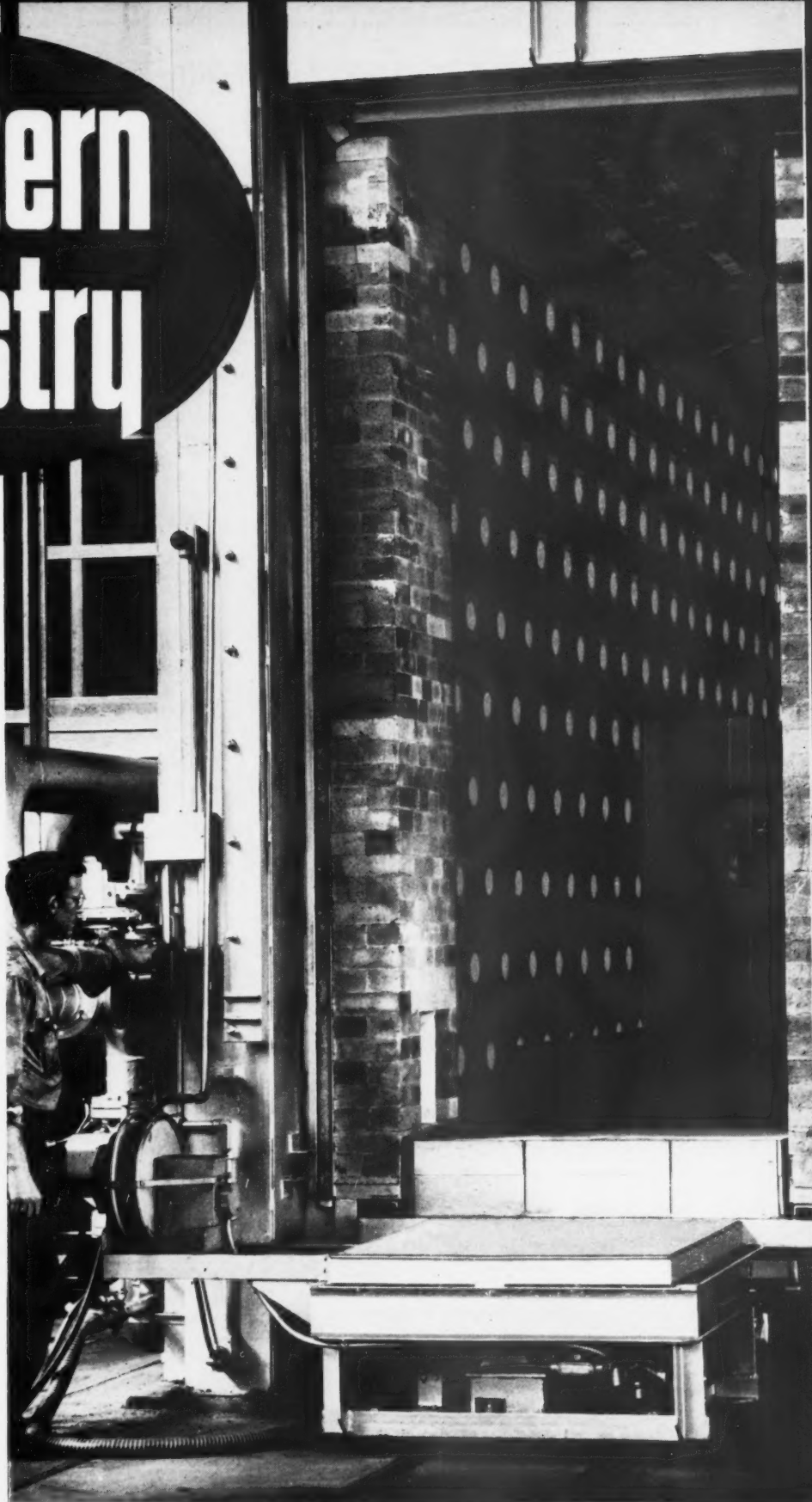
Western Industry

July 1956

NEW PLANT USES FOR NATURAL GAS

... to speed production and reduce costs, detailed on pp. 1-34, are of vital significance to Northwest plants with advent of natural gas in the area, and a challenging checklist of ideas for all Western plants. Pictured at right: revolutionary Selsas "fast-heat cycle" radiant heat gas furnace preheats gigantic dies to 1,000 deg. F. for Alcoa one-fifth the time of conventional furnaces.

**DOOR MAN'S
AUTOMATION**—Part of a new series describing production-boosting Western tricks any plant can use, p. 40.



BEST MANUALS ON DRIVE BELTS—yours for the asking . . . p. 60

clear-span Soulé Buildings have more



S P A C E C E

**Space at low-cost
Space that's convenient**

**Space that's all usable
Space that's ready in days**

No matter what your building need — manufacturing, fabricating, warehousing, transportation, commerce—you'll get more usable area with Soulé Buildings. That's because exclusive Soulé clear-span steel frames eliminate space-wasting interior support columns and overhead trusses. Every square foot of building area is usable. You can plan more efficient production or assembly operations, use money-saving mechanical materials handling (fork lifts maneuver easily in a clear-span Soulé Building).

And a complete new Soulé Building can be erected ready for use within days!

Sizes to fit any need: Widths: 32', 40', 50', 60', 70', 80'; Lengths: multiples of 20'; Eave heights: 10', 12', 14', 16', 18', 20'.

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**torture tests prove MONARCH
Mono-Cushions® WEAR BETTER**

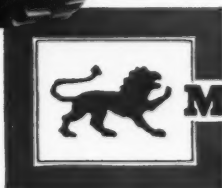
... TO THE FACTS. Severe fatigue tests on a Mono-Cushion and two leading competitive brands proved the MONARCH tire had *more than 50% greater resistance to wear, cutting and chipping*. The Mono-Cushion was a standard tire, molded from Monarch's new Compound T-48C ... the most durable solid tire stock developed to date.

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... for more details, circle No. 2 on Reader Service Postcard



July 1956

Vol. XXI, No. 7

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WESTERN INDUSTRY was established in January 1938 as the successor to WESTERN INDUSTRIAL GUIDE. Subsequently, it was published as PACIFIC COAST INDUSTRIAL BUYERS GUIDE, and later, as PACIFIC MACHINERY GUIDE. In October 1940 PACIFIC MACHINERY GUIDE was consolidated with WESTERN INDUSTRY, and both were published under the latter title. In early 1940 PACIFIC MILL, MINE & FACTORY was established, and in October of that year was consolidated with WESTERN INDUSTRY. All rights to the foregoing titles are reserved.

WESTERN INDUSTRY — July 1956

Can you do something about...



Yes...with the help of Shell men
and techniques and one grease

Shell Research men saw the same problem in scores of plants. Operators were stocking as many as 20 different special purpose greases. These top-heavy inventories meant double trouble—greasing errors, and too much money spent on greases.

Could one lubricant be developed to replace all these greases? Shell research men set to work to find out. After extensive testing, they developed the revolutionary new multi-purpose industrial lubricant that does the job—SHELL ALVANIA GREASE.

Alvania can be used in practically all grease applications in most plants. It cuts greasing errors, can cut your grease costs *in half*. Able to withstand both high temperatures and wet operation (Alvania retards rust), it also has a special oxidation inhibitor for increased stability.

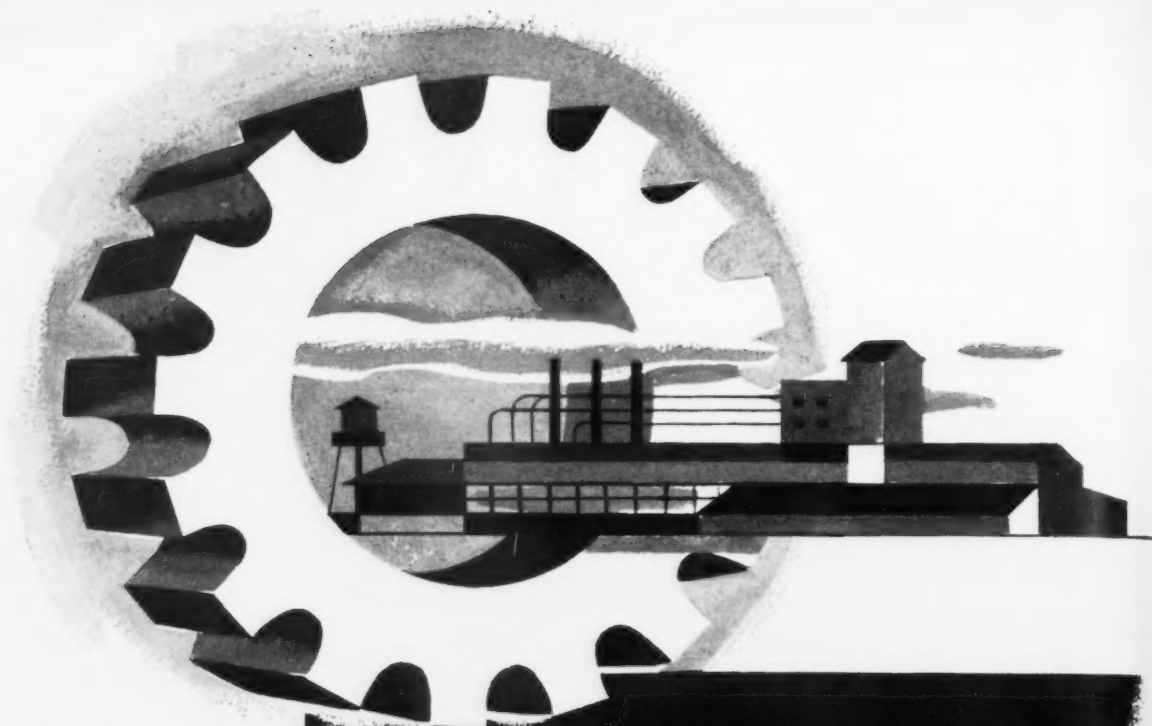
Alvania Grease is just one of many fine products developed by Shell's 1500-man research team—a team with 25 years' experience in lubrication problems.

A telephone call can put this team to work solving your special problems. Call in your Shell representative today.



SHELL ALVANIA GREASE

... for more details, circle No. 3 on Reader Service Postcard



INDUSTRY IS TURNING TO NATURAL GAS... in PORTLAND, OREGON

Plan now to be a cog in this rapid growing industrial center for the Pacific Northwest.

Portland Gas & Coke Company's 2,500 miles of distribution mains, serving a 440 square-mile area containing 82 communities, will be turning industry's wheels with NATURAL GAS in August of 1956.

Two great sources of supply will deliver an uninterrupted supply of natural gas to an already record-setting area for tremendous business and industrial growth.

This area exceeds a million dollars in annual retail sales now... and has seen a population growth of over 10% for the last five years. It's predicted to have a 72% gain by 1975 to 2,871,000 population.

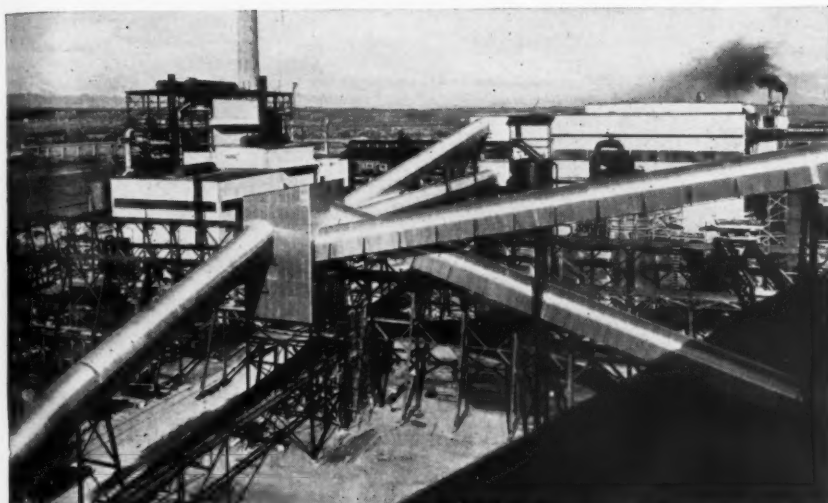
For first-hand information about your specific problems and natural gas supply, call or write...



PORTLAND GAS AND COKE COMPANY
PUBLIC SERVICE BUILDING **PORTLAND, OREGON**

... for more details, circle No. 4 on Reader Service Postcard
WESTERN INDUSTRY — July 1956

Link-Belt Supplies Mile-Long System of Belt Conveyors for Wood Chip Handling



TRANSFER TOWER is hub for aluminum-jacketed belt conveyors which collect and distribute chips for processing. Conveyor at left brings chips from

rail cars. Others (counterclockwise): tower to silos; silos to tower; from adjacent sawmills; tower to digesters.

THIS synchronized Link-Belt materials-handling system mechanizes a highly resourceful waste utilization program at the new Everett (Wash.) kraft mill of the Weyerhaeuser Timber Company.

Believed to be the longest of its kind, the network helps process waste from four sawmills. Each day 250 tons of additional paper pulp are produced, yet not a single extra tree has to be cut. What's more, the mill is considered to be the only one in the world without a woodroom for debarking logs and converting them into chips.

Enclosed belt conveyors carry chips from two adjacent mills to transfer tower. Waste from two remote mills comes in by rail, discharges to hopper by a novel Link-Belt system, is conveyed to tower. Chips then go to silos, back to transfer tower and on to digesters for processing. In addition, Link-Belt screw and belt conveyors, elevators, feeders and drives handle materials—including hot lime—throughout the entire processing operation.



RECIPROCATING FEEDER is powered by P.I.V. drive... feeds lime to enclosed oscillating conveyor for delivery to slaker.



MOTORIZED TRIPPER with two-way discharge chute travels along belt, delivering chips to any of five storage silos below.



Mechanizes Mining of 1000 Tons Per Hour

Link-Belt screening equipment, stackers and belt conveyors play a major role in handling 1000 tons of iron ore per hour at the Comstock Mine of Utah Construction Company, Comstock, Utah.

Crushed ore is screened to three grades and stock-piled. Link-Belt tunnel conveyors with variable speed feeders withdraw material from stock piles as needed... blend it to suit specific blast furnace requirements.

Link-Belt equipment in ore

handling system includes vibrating screens, scalpers, tunnel gates, motors, drives, controls, reducers and trusses and steel supports.

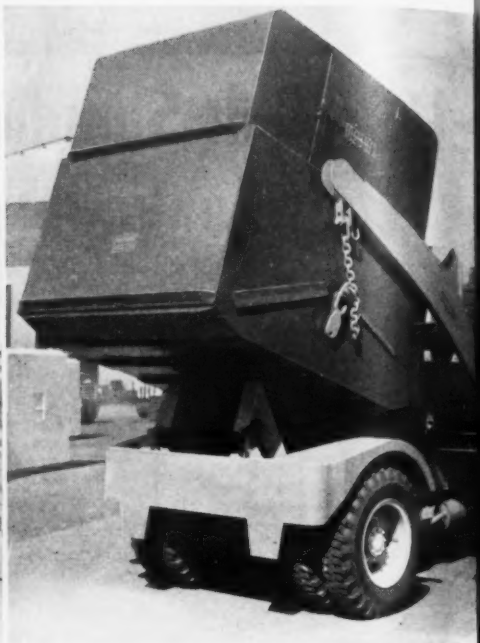
LINK-BELT COMPANY

Plants, Sales Offices and Factory Branch Stores at San Francisco 24, Los Angeles 33, Seattle 4. Sales Offices and Factory Branch Stores at Portland 10, Spokane 10, Oakland 7, Salt Lake City 1. Stock Carrying Distributors in Principal Areas.

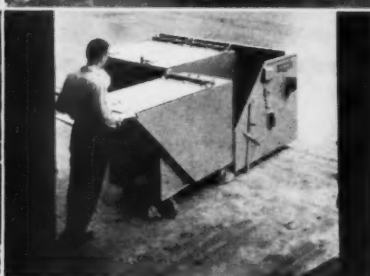
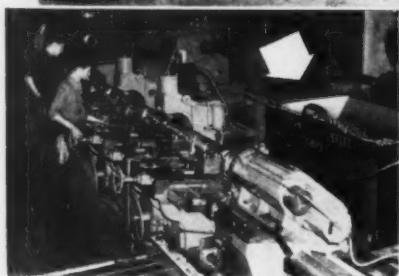
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... for more details, circle No. 5 on Reader Service Postcard

Here's the most versatile....lowest cost of bulk materials handling by truck ever



With only one man, it **PICKS UP . . . HAULS . . .**
Serves scores of big steel containers, all sizes and



It's the **DEMPSTER DUMPSTER®** System

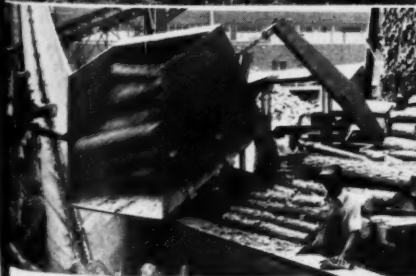
ABOVE ARE BUT A FEW of the hundreds of different Dempster-Dumpster Detachable Containers at work in industry today—containers built in capacities up to 21 cu. yds. . . . several times the capacity of the average dump truck body. It's like having one truck with scores of bodies!

ost method
ver devised!



Here's MASS-HANDLING of bulk materials with one truck ... one man! Multiply this simple pick up, haul and dump operation by scores of steel containers built to meet your requirements for handling waste or salvageable materials, raw and finished products, fluids, including acids, combustibles, dusty materials, etc. No other method handles waste and bulky materials so cheaply!

... and **DUMPS** (or sets load down intact) designs — handling materials of every description



WITH NO OBLIGATION on your part, our engineers will be glad to make a comprehensive fact-finding survey to determine the cost-cutting possibilities of this equipment in your plant. Ask us for complete information. Manufactured exclusively by Dempster Brothers, Inc.

DEMPSTER BROTHERS

576 N. KNOX, KNOXVILLE 17, TENNESSEE

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July 1956 — WESTERN INDUSTRY



Bites into hard ground. The Allis-Chalmers HD-6G weighs 19,600 lb., develops 55 belt hp, has big-capacity hydraulic system. Traction and power enable it to excavate or crowd into hard-packed material.

Take advantage of warehouse space in your own back yard

with an **ALLIS-CHALMERS HD-6G**

The trend toward yard storage has paralleled the trend toward the use of Allis-Chalmers tractor shovels in industry. This is no coincidence.

First, the HD-6G is capable of handling much of the construction necessary to prepare plant yards for outdoor warehousing. It helps build yard roads, digs and backfills drainage ditches and levels ground.

After preparation is completed, it handles most of the routine yard maintenance and plays a big part in the efficient handling of materials in your "roofless warehouse." Where bulk materials are handled, the HD-6G stockpiles or loads them with a big 1½-yd bucket. There is also a special 2¼-yd bucket for snow, coal, coke and other light materials. For solid, or palletized material, there is a lift fork attachment that can be quickly interchanged with the bucket.

Further, this crawler-mounted shovel keeps production moving summer or winter. It can wade through deep snow when necessary, or quickly clear it away.

Find out the many additional advantages of the tractor shovel method . . . the method pioneered, proved and improved by Allis-Chalmers. Write for free catalogs or see your Allis-Chalmers Construction Machinery dealer.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION
MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS



"Floats" on loose material. With crawler tracks, the HD-6G has sufficient flotation to work right up on stockpiles . . . enables it to store many more yards of material in a limited area.



Handles solid or palletized loads. By simply removing and replacing four pins, you can make a quick switch from bucket to lift fork attachment. Dozer blades, crane hook and several special buckets are also available.

... for more details, circle No. 7 on Reader Service Postcard

WESTERN INDUSTRY — July 1956

An engineering fact...

WROUGHT IRON PIPE

takes up to a
50% heavier coating of

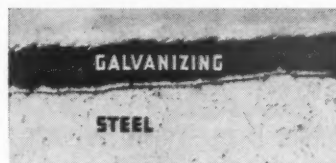


Tests prove the iron silicate fibers which give wrought iron its unusually high resistance to corrosion are also responsible for the material's ability to accept a considerably thicker hot-dip zinc protective coating than steel.

Our bulletin, *Piping for Permanence*, discusses galvanic protection, and reviews a variety of wrought iron pipe services. Write for your copy.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Division Offices in Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. International Division: New York, N. Y.

Available in Canada and throughout the world



These photomicrographs illustrate the ability of wrought iron to receive a tighter, heavier zinc coating. Because the life of the coating is directly influenced by its adherence and weight or thickness, zinc coating on wrought iron lasts longer.

BYERS Wrought Iron Tubular and Hot Rolled Products

ALSO ELECTRIC FURNACE QUALITY STEEL PRODUCTS

... for more details, circle No. 8 on Reader Service Postcard



"BEST PLACE TO LOOK FOR FUTURE INDUSTRIAL MANAGERS is among the technically trained," said George Trimble, vice president—engineering, the Glenn L. Martin Co., the other day at an American Management Assoc. conference.

These are significant words for the West. Here, a galaxy of small, medium, and a few large firms owe their beginnings to the initiative and inspiration of technical men. It is the typical Western firm these days whose entire "employment" just a few years (or a few months) back consisted of four or five scientists and engineers banded together to undertake a manufacturing enterprise.

A serious challenge to the success of a manufacturing business founded on a basis of creative engineering brainpower arrives when a nucleus of technical men must convert their thinking skills from science, where correct and precise answers to problems can be found, to management situations, where no "correct" answer exists. It's a challenge that has been met, successfully, by many Western firms—Ramo-Wooldridge, Varian Associates, Ampex, Hiller, Beckman, to name a few. But for every firm that succeeds in this difficult transition of thought approaches, many fail.

In WESTERN INDUSTRY this fall, a series of articles will be devoted to helping technical men face up to their new management responsibilities, providing a much needed service for those who may be failing.

ANOTHER SIGN OF THE INDUSTRIAL WEST'S GROWING SELF-SUFFICIENCY—to date, California manufacturers have received more than 85% of the contracts issued by General Electric Co. and Bechtel Corp. for the myriad of tanks, pumps, piping, structural steel, etc., needed for GE's 5,000-kw. atomic electric power plant and laboratory now being built in the Livermore-Pleasanton area.

DON'T BE AN "AUTOMATION HOLD-OUT," postponing improvement in your production techniques until the day when you can afford the extensive time and equipment expenditures needed for elaborate and all-encompassing changes! Recognize instead that enormous increases in productivity can often result from simple innovations applied to *individual* operations. Think of these improvements as small "islands" in the entire archipelago of automatic operations that will characterize your plant of the future, analyzing each island both for its merit in speeding production or decreasing costs *today* and in being an important unit of your archipelago of automaticity *tomorrow*.

This month, WESTERN INDUSTRY initiates a new series of articles that will show you how other Western plants are already island-hopping toward automation by applying smart but simple ideas to individual production set-ups. We're calling the series "Poor Man's Automation"—a title that connotes two thoughts: application of the ideas cost relatively little to begin with, and each represents a step toward ultimately higher levels of mechanization.

See page 40 for the first series of ideas, and watch for "Poor Man's Automation" in future issues. We guarantee you'll learn of some specific ways to get started island-hopping in your plant.

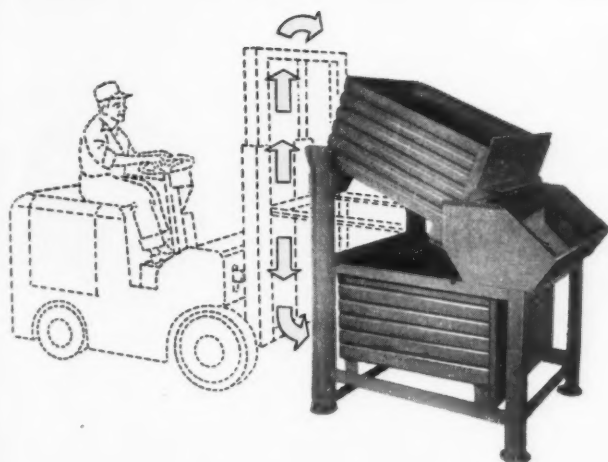
IN THIS BUSINESS OF MAGAZINE PUBLISHING

it is necessary to prove that our thousands of copies each month get into the hands of men who are directly concerned with plant operating management. Years ago, publishers presented such information based on their own statement, and sometimes that was not too factual or accurate.

As a result, the advertisers who use the pages of business publications to reach specific audiences demanded a more accurate and standardized counting and classifying of the men who receive them. Two major auditing agencies have resulted—and WESTERN INDUSTRY pays one of them (Business Publication Audit) to tally and classify our readers.

True to all types of auditing, the information which is acceptable must be direct. So every year or two it is necessary for us to ask you to put a few check marks on a questionnaire and sign it to indicate you are in plant operating management, and that you are without a doubt receiving the publication.

HAVING POWER PROBLEMS IN YOUR PLANT?
There's help on the way—in the September WI.



HANDLING

Powell's strikingly simplified Flow-matic® system of mass material handling has proved it can increase the efficiency of the lift truck operation by as much as 30 percent. The entire operation, both working and receiving units, is confined to a single compact station, easily accessible to lift trucks. This reduces floor area required and eliminates time-consuming "lift truck jockeying."

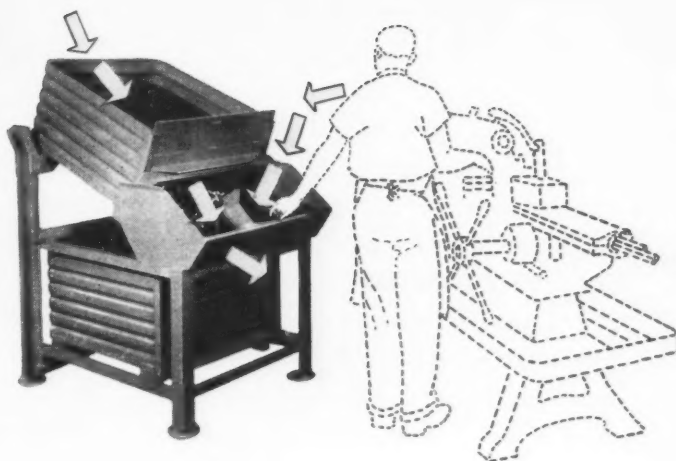
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Only FLOW-MATIC* Saves Both Ways!

PRODUCTION

Because it is a single-station unit, machine operator fatigue is substantially reduced. He need only make a single movement to both dispose of finished piece and select one to receive work. Too, because the entire unit requires a minimum of floor area, machines can be spotted closer together, permitting more efficient use of available space.

Before you place your order for materials handling equipment, be sure you have acquainted yourself with Flow-matic®. Contact the Powell representative in your area or write direct for full details.



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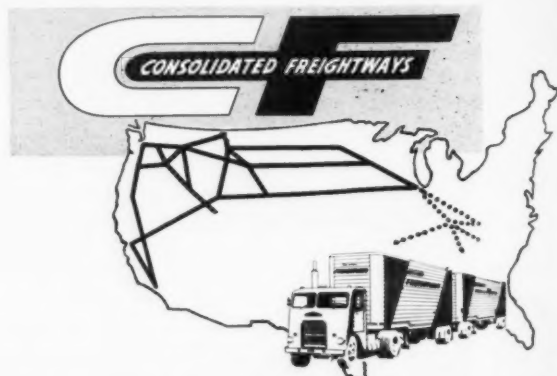
When your shipping room is bustling with orders for customers at a hundred destinations—you need a friend. Some *one* carrier who can easily, efficiently and economically assume the responsibility of your direct distribution. It's here that Consolidated Freightways can serve you best—because

CF serves more points direct than any other carrier in the West. So when you ship LTL* or full load, one shipment or one hundred, call CF—every shipper's friend. CF offers you direct routing and fast daily schedules PLUS one carrier convenience and one carrier responsibility.

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WESTERN INDUSTRY — July 1956

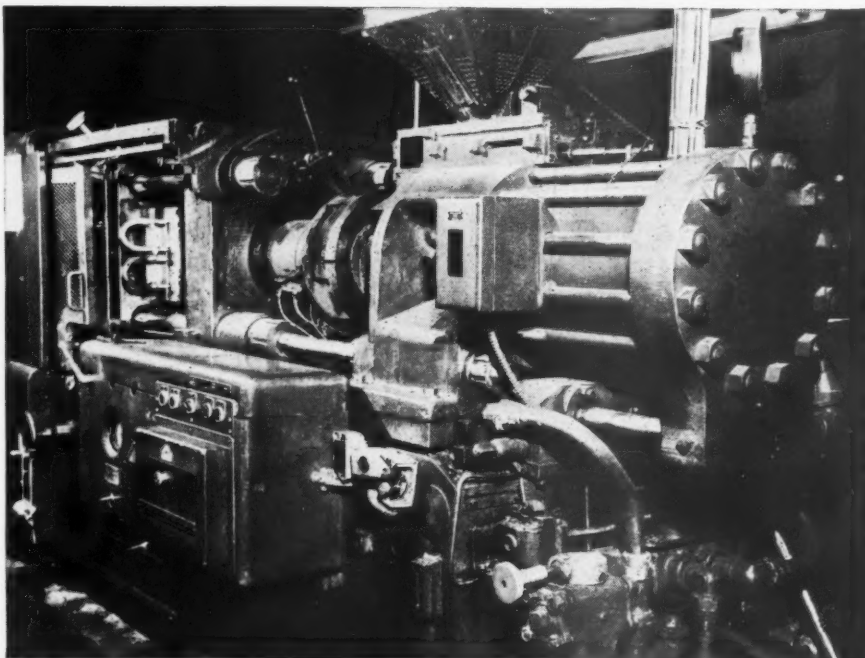
Standard Engineer's Report

CASE HISTORY
Calol OC Turbine Oil
PRODUCT

Windman Brothers,
FIRM Los Angeles, Calif.

Inhibited oil cuts maintenance costs \$1200 a month!

BEFORE USING CALOL OC TURBINE OIL in the hydraulic system of this and 9 other plastic injection-molding machines, Windman Brothers, Los Angeles, shut down an average of 4 machines a month to clean oil deposits from valves. Parts, labor, and down-time cost \$1200 a month. Calol OC Turbine Oil stopped this trouble and has eliminated repairs due to lubrication on all of the machines for more than 5 years. The oil stays clean in spite of operating at constant temperature of 135°F. and under 1000 psi pressure, 24 hours a day, seven days a week. The machines make many kinds of plastic objects. Windman Brothers have produced more than 50,000,000 fountain pen parts like those shown below.



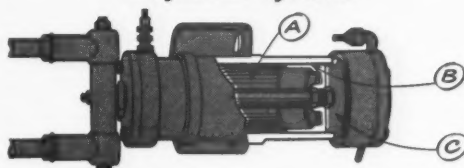
FREE CATALOG: "How to Save Money on Equipment Operation," will be sent on request to Standard Oil Company of California, 225 Bush St., San Francisco.

FOR EXPERT HELP on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative, or write to 225 Bush Street, San Francisco, California.



TRADEMARK "CALOL" REG. U.S. PAT. OFF.

How CALOL OC Turbine Oil cuts costs in hydraulic systems



Used as the hydraulic medium in feeds and lifts of any kind, Calol OC Turbine Oil will not form carbon or foam excessively.

- A. Contains very effective oxidation inhibitor—will not deteriorate and plug lines and retard action of cylinders.
- B. Corrosion inhibitor prevents rusting and pitting—has high metal-wetting ability.
- C. Separates readily from water or other contaminants—dirty oil may be reclaimed easily... charge lasts indefinitely, leakage only cause for replacement.

STANDARD OIL COMPANY OF CALIFORNIA

July 1956 — WESTERN INDUSTRY

... for more details, circle No. 11 on Reader Service Postcard

15

MEMO TO MANAGEMENT

If you're not already using structural adhesives in your plant, the chances are that you will be soon. These new chemical adhesives, which a decade ago were a laboratory curiosity, are being produced in the United States today at the rate of a million pounds a year—and they're still not meeting demand.

WESTERN INDUSTRY
May, 1956

An Invitation to...

**cut costs . . . speed production . . .
improve your product . . . with . . .**

STRUCTURAL ADHESIVES by NARMCO

TODAY, PROGRESSIVE COMPANIES across the nation are investigating and applying science's newest fastening technique—fast, economical, efficient adhesive bonding. By replacing rivets, welding, nuts, bolts, and other costly fasteners, adhesive bonding saves money and speeds the production of a host of manufactured goods.

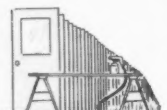
THE LIST OF EXTRA ADVANTAGES is long, indeed. With adhesives, you join dissimilar alloys with no danger

of corrosion, and one adhesive bonds metal, wood, glass and synthetics. In addition to permanent atom-to-atom bonding,

adhesives dampen vibration, provide positive sealing action as well as heat and electrical insulation. They also give smooth surface contours and, in most applications, reduce weight, increase service life and drastically cut production costs. Adhesives are easily applied with brush or air gun; unskilled workers can be quickly trained in production bonding.

APPLICATIONS? ALMOST ANY fastening, finishing, sealing or repairing job can be accomplished faster and less expensively with adhesives. Whatever you weld, bolt, rivet or mechanically fasten,

you can bond. The list includes doors, paneling, furniture, show cases, pre-fab



structural components, sandwich-type signboards, cargo containers, refrigerators, storage buildings, hangars, portable shelters, scaffolding, outdoor movie screens—money saving industrial and commercial applications of structural adhesives are truly limitless!

THIS IS YOUR INVITATION from Narmco Resins & Coatings Company—the pioneer developer of structural



adhesives—to learn how easy-to-handle, room-temperature-setting adhesives can hammer down costs in your plant. Write, wire or telephone today for detailed information on Narmco's special industrial adhesives 3135 and 3120—laboratory-developed for simplified brush or air gun bonding of metal, glass, wood and synthetic products.

NARMCO

NARMCO RESINS & COATINGS CO.
Dept. 181
600 Victoria Street, Costa Mesa, California

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LETTERS

Gremlins in the type room

EDITOR—I read with interest the article, "The West's Battle for Engineers," in the May issue of WESTERN INDUSTRY. While I feel this article calling attention to the national shortage of engineers was most worthwhile, I must point out that some one—the editor, writer, or perhaps one of those gremlins which invade typesetting rooms—made some substantial changes in the statements attributed to me.

Northrop Aircraft is not interested in "... bad or indifferent (engineer) ..." as suggested in the article. On the contrary, in the face of vigorous competition for engineering talent we have made a real effort to be selective. We try to restrict our employment offers to top-quality engineers with outstanding talent and with the stability which leads us to believe they can contribute continuously over a long period of time to our important projects.

This is a basic company policy which I have had some part in forming.

Our purpose will continue to be to obtain the best possible skilled personnel available; to provide the maximum of opportunity and job satisfaction and to recognize each member of our personnel as a distinct individual and not as a cog in an industrial machine. I am sorry, constructive as this over-all article was, that I must take this strong exception to the individual comment mistakenly contributed to me.

JOHN B. CLARK

Director of Industrial Relations
Northrop Aircraft, Inc.
Hawthorne, Calif.

(Our apologies, Mr. Clarke, to you and all of the engineers at Northrop for allowing this entirely misleading and erroneous statement to appear in print.—Ed.)

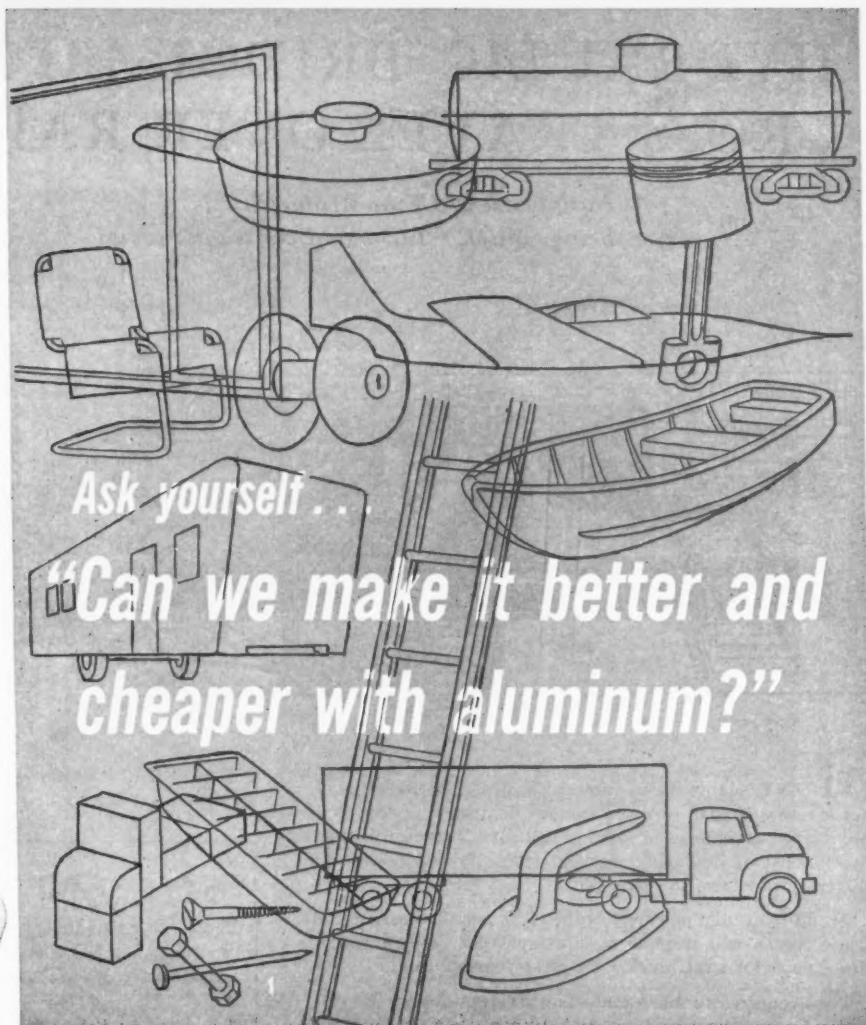
Kudos for WI

"You present many good articles of particular interest to the West." J. R. LINSKEY, Maintenance Superintendent, Oregon Steel Mills, Portland.

"I consider WESTERN INDUSTRY one of the best business magazines I review. It's a 'high-count uranium mine' of information."—GEORGE SHIELDS, Pub. Dem. Supervisor, Pacific Tel. & Tel. Co., Spokane, Wash.

(Many thanks!—Ed.)

WESTERN INDUSTRY — July 1956



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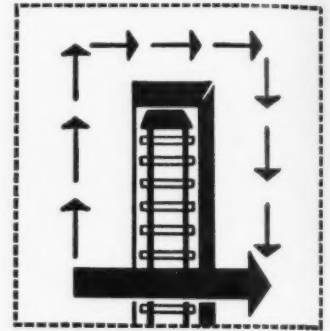
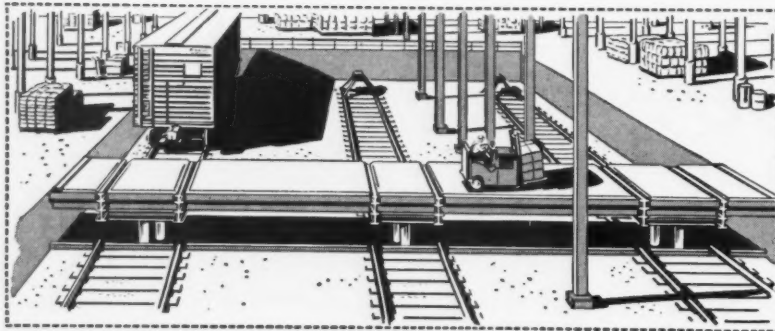
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HYDRAULIC BRIDGE LIFT SPEEDS CROSS TRAVEL OVER RAIL SIDING

*Initial cost of Globe Bridge Lift
brings quick returns and continuous savings*

By John R. Queen
Vice President and General Manager



MANY plants have internal railroad sidings which cut a recessed path across a factory floor or shipping dock area. The convenience of loading rail cars is partially offset by the cost of detouring internal traffic from one side of the track platform to the other.

An oil-hydraulic powered Bridge Lift installed across the track recess will provide a short-cut route which oftentimes pays for itself during the first year of use.

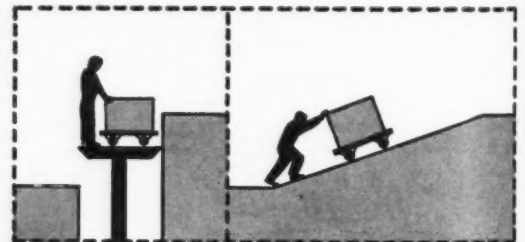
Time required to move materials straight across the rail siding is sometimes as little as 1/10th of that for the long trip around. Applying this saving to manpower and equipment means a substantial, continuous return on the Bridge Lift investment.

The Globe Bridge Lift illustrated above provides a two-lane route for heavily loaded fork trucks across three tracks. Three pairs of oil-hydraulic cylinders raise and lower the platform with its built-in track lengths. In the down position, the rail route is clear. In a matter of seconds, the bridge is raised for cross movement of men and materials.

Globe Hoist Company manufactures Bridge Lifts to meet any specification . . . to span 5 ft. or 50 ft. gaps and across single or multiple tracks. These lifts are assembled from standard power cylinders and structural components . . . thus these lifts are low in first cost, easy to install and economical to use.

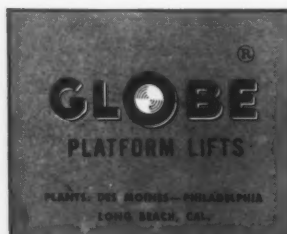
Detailed information on Globe Bridge Lifts can be had by filling out the coupon below.

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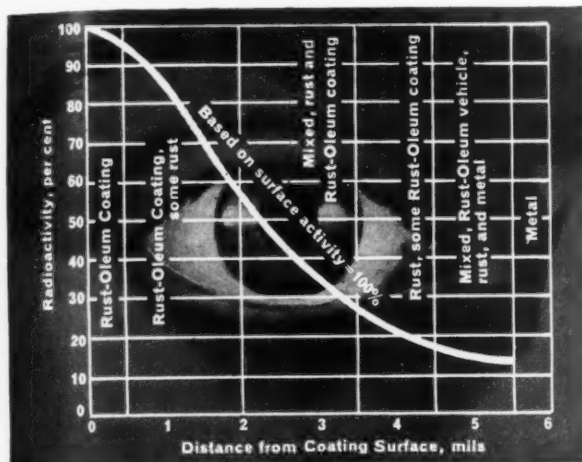
Please send me your book: "Case Histories in Modern Lifting" together with complete information on:
... Globe Bridge Lifts; ... Globe Ramp Eliminator.

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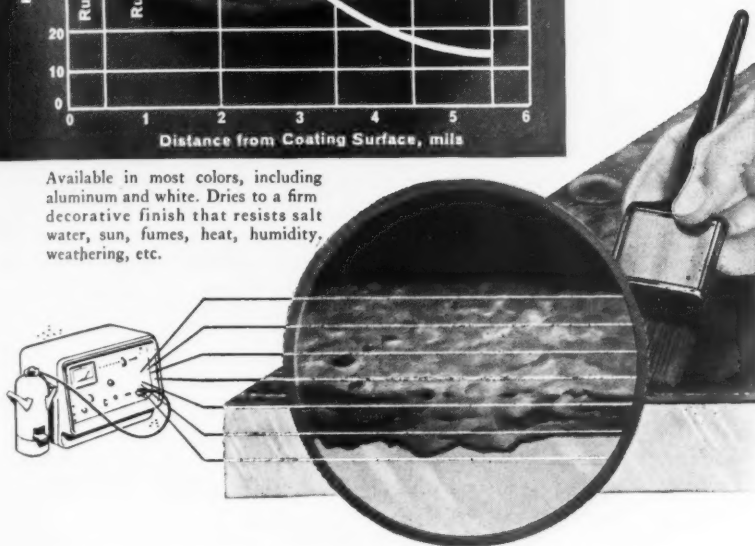
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WESTERN INDUSTRY — July 1956

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penetrate rust to bare metal through
the "eyes" of radioactivity!



Available in most colors, including aluminum and white. Dries to a firm decorative finish that resists salt water, sun, fumes, heat, humidity, weathering, etc.



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The results of this research are yours in a thirty-page report entitled, "The Development of a Method To Determine The Degree of Penetration of a Rust-Oleum Fish-Oil-Based Coating Into Rust On Steel Specimens," prepared by Battelle Memorial Institute technologists. Attach coupon to your business letterhead for your copy. Accept no substitutes. Buy and specify only Rust-Oleum. You'll be happy that you did.

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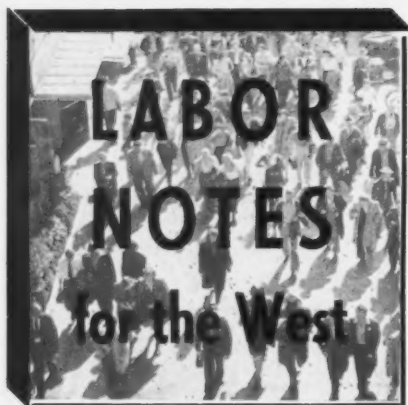
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WHY DO SOME FOREMEN FAIL? Determined to ferret out the basic reasons why many don't measure up to expectations, the National Management Assoc. has just completed a broad survey among the men who should know—their bosses. Findings of the survey should be keenly noted by every foreman, and by executives who pass on management responsibilities to foremen too.

Here's how the survey was carried out. NMA's research department sent questionnaires to a representative group of executives across the country. The question "Why do some foremen fail?" was designed to allow maximum freedom in answering. The return, according to NMA executive vice president Marion Kershner, was an astonishing 61%. Most respondents wrote extensively and many of their thoughts were the reflection of an entire company management. The NMA research staff, after compiling the answers, came up with these conclusions:

Executives generally hold foremen responsible for their own failures in these respects in the order stated:

1. Inability to deal effectively with personal relations problems, both with workers and with other management men.
2. Personal shortcomings, such as lack of initiative and emotional instability.
3. Lack of management attitude and understanding.
4. An unwillingness to spend leisure time and effort on managerial self-development.
5. Inability to plan effectively and organize work, and to adjust to changing conditions.

Good human relations was mentioned most often, but there were varying reactions as to the degree of proper emphasis, and as to what constituted "good human relationships" to begin with.

The following three quotes from the questionnaires reflected different facets of this thinking:

"Call the reason what you will—a negative social attitude, social incompetency, or just plain arrogance and irritability—the greater percentage of foremen fail because they will not accept and apply the basic principles of good human relationships."

"To become a successful foreman, one has to, among other things, like people and know how to get along with them."

"With the emphasis we place on human relations, new supervisors frequently get the impression that their main job is to keep their employees happy. They miss the point that their main mission is to get the job done."

Executives laid plenty of faults at their own door-steps too, with these being the most frequently mentioned:

1. Inadequate training of foremen.
2. Inadequate foremen selection and training methods.
3. Failure to define and spell out what is expected of the foreman.
4. Lack of follow-up by the foreman's superior through counseling and evaluating performance.
5. Poor management communications, especially in disseminating policy decisions from top management to foremen.
6. Failure of executive management to provide proper motivation for a good job through both monetary and non-monetary incentives.

Other factors such as union infringement on the foreman's authority and labor's reluctance to accept foremen as part of management were mentioned in the returned questionnaires but not weighted as heavily as the six points just listed.

"The foreman's job is a very difficult one, highly exacting in personal requirements,"—on that point there was no disagreement among executives. To illustrate, one company vice president was quoted as saying: "We long ago discovered that we must inquire into the temperamental make-up of an individual to find whether or not he possesses a genuine aptitude and liking for the rather complex job of guiding the work of others. To us, skill and competence in a given field of industrial endeavor is always secondary to a requirement that a management man be able to work successfully with people. Our findings have clearly indicated that such individuals are rare."

The National Management Assoc., energetic organization making the survey, is now the world's largest management association, with 70,000 members. (Until a couple of months ago, it was called "The National Assoc. of Foremen.") Although the 30-year-old non-profit organization was founded in Ohio, California has in just the past decade outdistanced all other states in NMA members. (California now has 15,000 members in management clubs affiliated with the NMA, while Ohio has a few more than 13,000.)

If you want more information about the NMA, write direct to headquarters at 321 West First St., Dayton 2, Ohio, or circle No. 300 on this month's Reader Service Postcard (page 67), and we'll be glad to see that you get all the details.

WHAT ABOUT NEGOTIATED HEALTH AND WELFARE PLANS IN THE WEST? A good guide to trends is provided in a report issued by the California State Dept. of Industrial Relations and the Dept. of Preventive Medicine, Stanford University School of Medicine, detailing a joint study made of all northern California health and welfare plans established by collective bargaining. Here are highlights of the findings:

The employer pays the entire cost of the premium for 90% of the workers eligible for benefits under the plans surveyed, and for the dependents of more than half the workers. Although most dependents are covered, the report indicates that the benefits available to them are less liberal than for the workers.

The survey found that the plans offered a wide variety of benefits for the majority of the employed workers. Not only are they covered for hospital and surgical care but also for physicians' visits in the home and office, outpatient laboratory and X-ray services, maternity care, and poliomyelitis. For dependents, the chief services are hospital and surgical care. In the majority of cases, physicians'

... continued on page 22

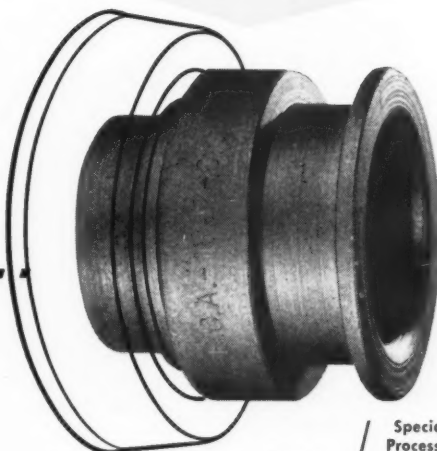
"SWITCH!"

said Ostuco

... and savings were surprising!

Pleasant surprise, too! Bearings Company of America, Division of Federal-Mogul-Bower Bearings, Inc. Lancaster, Pa., was machining OSTUCO seamless tubing to make a clutch release bearing collar used as original and replacement equipment. Results were fine!

Then word came from OSTUCO, recommending a switch to OSTUCO's newly developed NP-60, tubing specially processed for machineability. Cost was slightly higher, but BCA and Ostuco engineers predicted the savings would justify the change.



they switched...

and they SAVED!

	Regular	Specially Processed NP-60
Production per 8 hour shift (units)	675	840
Production time per 1000 units (hours) . . .	12.35	10.03
Total Labor per 1000 units (man-hours) . .	13.09	10.63

Besides the savings, Bearings Company of America was pleased with the better finish of the new part. They point out that the collar in photo above "shows the finish as it comes directly off the machine."

It happens this way often enough to warrant checking with Ostuco about your tubing applications and production problems. Contact your nearest Ostuco Sales Engineer or write direct to the Shelby factory —there's no obligation!



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The Ridge Tool Company, Elyria, Ohio, U.S.A.

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LABOR NOTES

... continued from page 20

services outside the hospital are not provided as for the breadwinner.

The amounts allowed in the various plans were analyzed as of May 1954. At that time a rate somewhere between \$10 and \$12 per day for a maximum of 70 days was the most common hospital allowance for the worker. The maximum hospital stay for dependents was 31 days in most plans. More than two out of five of all the workers covered by the plans surveyed were assured the full cost of a ward bed or better without any additional expense to themselves. In plans which indemnified the sick worker, a maximum surgical allowance of \$300 was most often provided for both worker and dependents.

When the worker was reimbursed for a visit to the physician's office, \$3 or \$4 was the amount generally specified. For a home visit, where allowed, the worker usually received either \$5 or \$6 from his plan. For laboratory and X-ray services for patients not hospitalized, the employee's benefit was most frequently set at an upper limit to \$50 and for his dependents at \$25.

Two-thirds of the workers under northern California negotiated health and welfare plans were covered by plans underwritten by insurance companies.

Some plans provide certain medical care benefits on a service basis. These specify the types of services the patient is entitled to instead of fixing a maximum money indemnity allowance. One-third of the workers were covered by such plans.

In addition to detailed data on medical care benefits, the report contains information on life insurance and other nonmedical benefits provided by the plans. Also covered in the report are eligibility and termination provisions and employer-employee contributions to the costs of the plans.

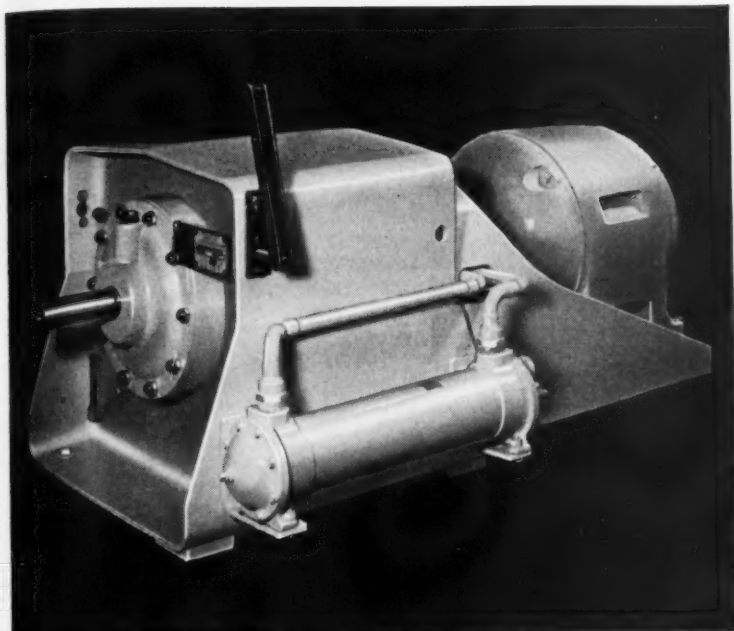
If you want to see the full report, single copies are available without charge to individuals or organizations in California from the Documents Section, Printing Division, 7th Street and Richards Blvd., Sacramento 14, Calif. (Title of the booklet is *Labor-Management Negotiated Health and Welfare Plans, Northern California*.) Quantity copies to California individuals and organizations, and single copies outside of California, are available for 52c each.

A NEW WRINKLE IN MANAGEMENT-EMPLOYEE RELATIONS had its locale in the Mojave Desert area of Southern California the other day. When officials of Northrop Aircraft's Palmdale facility held a management conference with officers of the American Potash & Chemical Corp. at Trona, all was routine except—they took with them to Trona 1,600 employees in 500 automobiles!

While the officials stuck to business discussing mutual problems of the two firms, employees pulled out all the stops having a good time. Recreation clubs of both companies contested at golf, skeet shooting, archery, and swimming—even midget auto races, with the "midget" drivers aged 6 to 10.

According to Northrop and AP&CC officials, the idea had two values: officials interchanged ideas having definite values in solving maintenance, management, and other problems; the day of recreation for all personnel was an aid to both companies' employee relations programs. Many of the employees, particularly at the relatively new Palmdale facility, are newcomers to the desert area.

Gýrol Fluid Drives limit torque to give you a built-in safety factor!



Type VS, Class 2 Gýrol Fluid Drive is available in ten sizes, 1 hp to 800 hp, speeds to 3600 rpm.

FEATURES

- Can be reversed while in motion by reversing motor
- Across-the-line starting on many applications
- Motor can reach full speed before engaging load
- A compact, self-contained unit
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Speed control for the paper and textile industries

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The American Blower Type VS, Class 2 Gýrol Fluid Drive not only offers adjustable, stepless speed control, but its inherent shock-absorption ability protects machinery.

For, a Gýrol Fluid Drive will limit the amount of torque which can be transmitted under overload conditions. This torque-limiting capacity can be adjusted by merely positioning the speed-control lever.

What's more, Fluid Drive permits the motor to come up to speed under almost no-load conditions—allowing simplification of motors and starting equipment for heavy starting loads.

You'll discover many more important benefits for a wide variety of industrial applications by calling our nearest branch.

American Blower products serve industry

- AIR CONDITIONING, HEATING, VENTILATING EQUIPMENT
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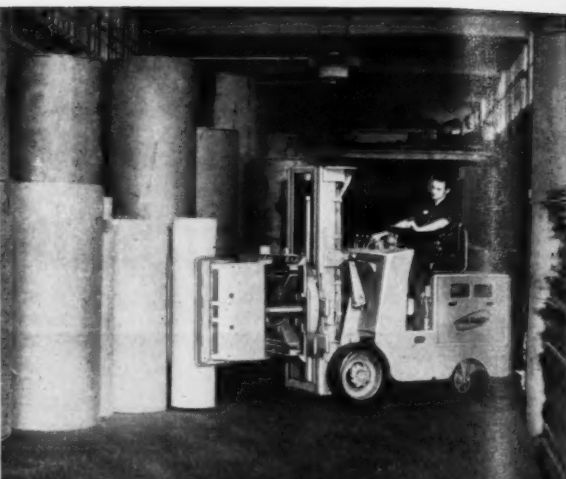
AMERICAN 75 BLOWER



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SAVE SPACE—Using ELPAR high lift trucks, a foundry devised a special core handling system that doubled effective use of their storage area. Trucks speedily high tier racks of fragile cores without damaging them.



SAVE STOCK—Using ELPAR roll clamp trucks, corrugated box maker has reduced paper damage to almost zero. Unique ELPAR clamp handles rolls from 51" in diameter down to small butt rolls without manual adjustment.

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66% of the 75 largest U.S. manufacturers use ELPAR trucks because their savings soon repay the truck investment. You can save, too! Write for complete ELPAR catalog.

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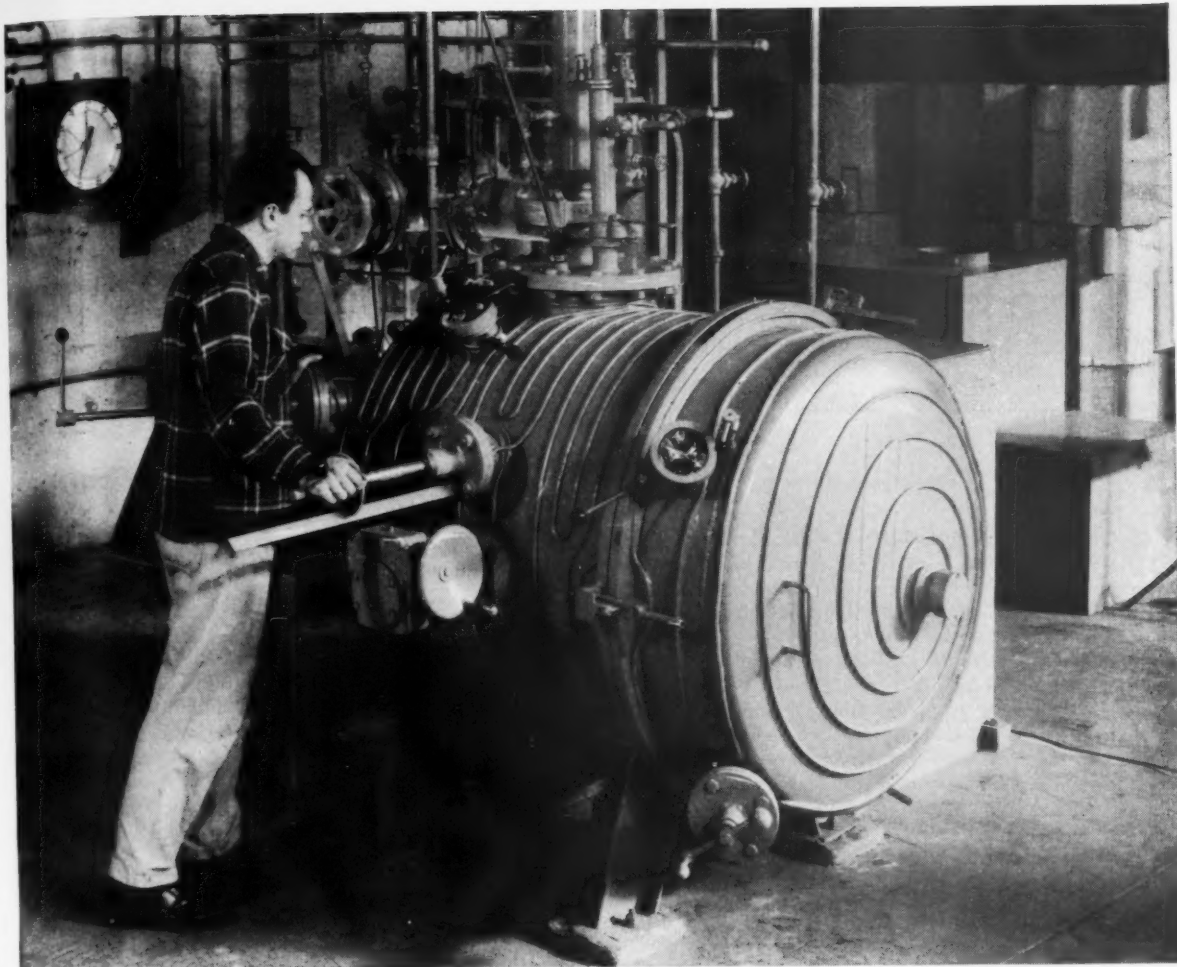
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SAVE DOWNTIME—"Split-second" deliveries to their automated assembly line are a must at Studebaker-Packard. Built-in dependability of ELPAR trucks keeps them always on the job, preventing costly bottlenecks.



SAVE MONEY—Salt refiner finds rugged ELPAR construction plus easy preventive maintenance cut operating cost. Surveys prove electric trucks operate for at least 50% less than gas trucks.





turning steel into **SUPER STEEL**

Within this vacuum furnace may lie the answer to a problem important to every user of alloy steel. This problem is the various gas impurities which dissolve in steel while it's being made. These gases limit the strength of the steel.

At National Supply's Torrance, California, plant, an experimental furnace has been installed. It produces steels and alloys of super quality. It may, we hope, result in upgrading the fine alloy steel used in all our products.

To the melted steel, alloys are selectively added by the operator, using a sliding control arm. He watches through an inspection port as it is melted in a vacuum 760,000 times thinner than the air we breathe.

This is typical of the research that goes into every special steel job performed for western industry. And, combined with complete facilities, engineering skill and experienced plant operators, it means your big, specialized

job can be handled easily and efficiently. Call or write the address below for more information. Or better yet, plan a visit to the plant soon—and see for yourself.



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July 1956 — WESTERN INDUSTRY

25



WESCON 1956 IS A SELL-OUT even though an extra 100 booths were included in early planning. The 30,000 engineers, scientists, and business representatives in the electronics field who plan to attend the Western Electronics Show and Convention in Los Angeles August 21-24 will be greeted by 750 exhibitors at the Pan Pacific Auditorium.

Among the exhibits will be the latest in automation, digital and analog computers, motor controls, servo mechanisms, instrumentation, and data reduction equipment. Also on display will be mass spectrometers, process controls and magnetic amplifiers, making Los Angeles the virtual electronics capital of the world during the five-day session.

Sponsored jointly by the West Coast Electronics Manufacturer's Assoc. and the Los Angeles and San Francisco sections of the Institute of Radio Engineers, the show has been gaining momentum each year, as evidenced by an increase of 180 exhibitors and an expected increase of 10,000 in attendance over last year's event in San Francisco.

Concurrent with the show at the Pan Pacific will be conferences at the Ambassador Hotel, where sessions will be held on engineering management, instruments, military electronics, control theory and methods, cybernetics, analog and instrumentation techniques, and production consideration of electronics equipment. Representatives from Hughes Aircraft Co., Bendix Aviation Co., U. S. Naval Ordnance Test Station, General Electric Co., and Stanford Research Institute will be among the speakers.

ATTENTION ENGINEERS AND TECHNICIANS! ASTM's second Pacific Area National Meeting program, largest in scope in the group's history, will get underway on September 16 and run until the 22nd at the Statler Hotel in Los Angeles. Research and testing symposiums will cover everything from railroad materials to radioactive isotopes, touching in between such subjects as lubricants, titanium, industrial finishes, wood poles, industrial water, plastics, soils, cement, copper, and many others.

Twenty firms in and around Los Angeles have extended invitations to those attending the American Society for Testing Materials' meet to inspect their laboratories and plants. And when not on plant tours or at symposiums convention go'ers can visit an exhibit of testing and scientific apparatus and laboratory supplies, which is being arranged especially for the instrument makers of the West,

with a substantial number of apparatus and instrument manufacturers from the East taking part also.

A special feature of the meeting is a group of seven industry luncheons which will provide a focal point for men in the fields of soils, cement and concrete, paint, petroleum, wood, water, and railroads. At these luncheons engineers, technicians, researchers, and management in the seven industrial groups will have an opportunity to exchange ideas and hear talks by men in their respective fields.

WATER, ENERGY, AND OTHER RESOURCES vital to the industrial growth of the West will be emphasized at the Western Area Development Conference at the Hotel Westward Ho in Phoenix come October 31. The two-day conference, co-sponsored by Stanford Research Institute and the Confederacion de Camaras Industriales de los Estados Unidos Mexicanos, a Mexican industrial association, will cover energy, resource development, land and water development in northwest Mexico, water resources, saline water conversion, sewage reclamation, industrial water re-use, and land economics.

SPURRED BY THE SUCCESS of its first West Coast Regional Convention and Trade Show in San Francisco last year, the West Coast Regional Liquefied Petroleum Gas Assoc. has again scheduled the event, this year on August 5-7 at the Sheraton-Palace Hotel. Last year some exhibitors had to be turned down for lack of space but this year exhibit area has been improved with a total of 56 booths available for displaying L-P Gas systems, gas appliances, measuring instruments, recording and control apparatus, and storage equipment.

The convention will run concurrent with the exhibits, which will be open every day; one general meeting will be held and the rest of the time will be given to work shop sessions on products and special subjects.

MEETINGS

YOU

SHOULD

PLAN

TO ATTEND

Aug. 5-7—NATIONAL INDUSTRIAL COUNCIL (INDUSTRIAL RELATIONS ASSOCS.), Sheraton-Palace Hotel, San Francisco. Contact Donald L. Mewhinney, director of public relations, 918 16th St., Washington 6, D. C.

Aug. 5-7 — LIQUEFIED PETROLEUM GAS ASSOC., West Coast regional convention and trade show, Sheraton Palace Hotel, San Francisco. Contact M. A. Ennis, West Coast secretary, 1355 Market St., San Francisco 3, Calif.

Aug. 6-8—SOCIETY OF AUTOMOTIVE ENGINEERS, San Francisco. Contact E. W. Rentz, Jr., Western branch office manager, 714 W. Olympic Blvd., Los Angeles.

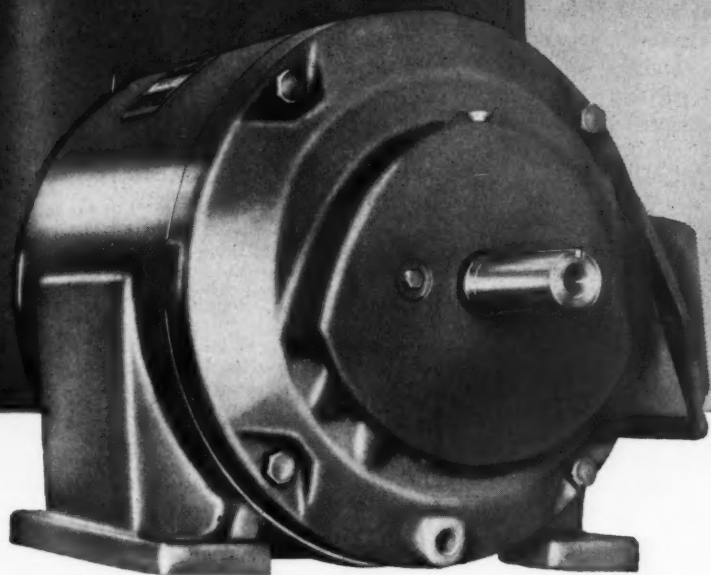
Aug. 6-8—WEST COAST SOCIETY OF AUTOMOTIVE ENGINEERS, regional convention, San Francisco. Contact John R. MacGregor, general chairman, 200 Bush St., San Francisco, Calif.

Aug. 21-24—WEST COAST ELECTRONIC MANUFACTURERS' ASSOC. and INSTITUTE OF RADIO ENGINEERS (seventh region), Western Electronic Show and Convention, Pan-Pacific Auditorium, Los Angeles. Contact Herbert Cerwin, WESCON, 344 N. La Brea Ave., Los Angeles 36, Calif.

... continued on page 28

Totally

Protected



**FROM
CORE
TO
COVER**

RELIANCE
Totally-Protected
MOTORS

The total protection concept of design and construction armors Reliance A-c. Motors against everyday hazards, with little or no maintenance. Total protection is made up of extra features like:

Slot cell insulation of Double Backed Mylar

Dynamically balanced rotor for vibrationless operation

Entire insulation system impervious to acids, moisture and oils

Metering plate regulates grease flow to bearing

Ventilation louvres positioned high and dry in end brackets

There are 100 of these extra core to cover protection features in Reliance Motors. Each point is covered in our bulletin, "Check the Facts". Why don't you write for one and get all the details?

B-1510

RELIANCE ELECTRIC AND ENGINEERING CO.

Dept. 327A, Cleveland 10, Ohio • Canadian Division: Welland, Ontario
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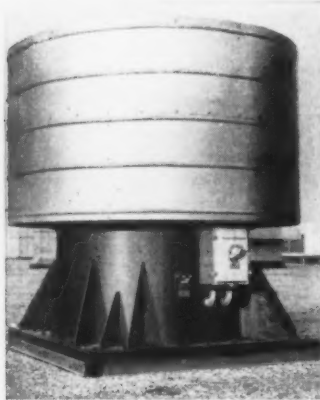
SKY-VENT ROOF VENTILATORS

CAPACITIES: 1,000 cfm through 250,000 cfm

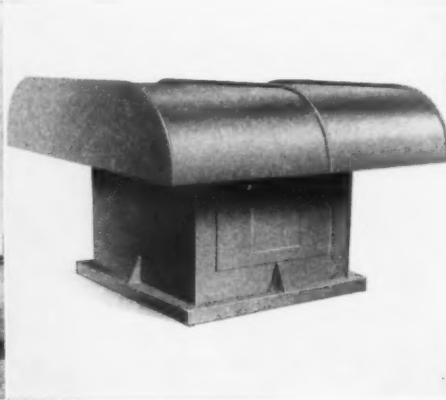
SIZES: 12" through 120"

"Buffalo" high volume power roof ventilators are designed to ventilate large plant areas not adjacent to outside walls or where expensive and bulky duct work is impractical. This type of ventilation lends itself well to rearrangement of plant layout without consideration for the ventilating system.

The "Buffalo" Propeller or Axial Type Fan in the stack has all the strength, efficiency and smooth operation that characterizes the "Q" Factor* in all "Buffalo" Fans. Recently introduced, these new units are being adopted by many of the country's largest plants for removing hot air, fumes and fogs from large areas. Why not investigate? Write today on your company letterhead for Bulletin FM-1234 and other descriptive material.



Style "V" Sky-Vent



Style "H" Sky-Vent

Counterbalanced dampers open when fan starts, close by gravity over V-shaped trough at top of inner cylinder when fan is shut off. Heavy gage stack contains integrally welded gussets supporting motor and propeller fan. Outside gussets provide rigidity, minimize vibration. For easy installation, a flanged roof curbing plate is welded to the stack.

*The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.

The Style "H" Sky-Vent head is made of heavy gage galvanized steel with integrally rolled stiffening flanges along its entire length and is internally braced with one-piece welded square hollow tubular frame. Hood design minimizes friction loss as air leaves unit.

The extra heavy galvanized steel stack with integral flanged curb plate has offset stiffening panels rolled into the side sheets and on larger sizes is further braced with one-piece welded square hollow tubular frame. Gravity, manual or motor operated shutters are available, mounted in the stack. Disconnect switch and internal wiring can be provided.

BUFFALO FORGE COMPANY
BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.



INDUSTRIAL EXHAUSTERS BELTED VENT SETS PROPELLER FANS "E" BLOWERS-EXHAUSTERS
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WESTERN MEETINGS

... continued
from page 26

Sept. 4-14—INTERNATIONAL ASSOC. OF MECHANICAL ENGINEERS, A.F.L., San Francisco. Contact Eric Peterson, secretary-treasurer, Ninth St. and Mt. Vernon Pl. N.W., Washington 1, D. C.

Sept. 10-12—AMERICAN SOCIETY OF MECHANICAL ENGINEERS, fall meeting, Denver, Colo. Contact A. A. Woodward, Public Service Co. of Colorado, 5525 E. 38th St., Denver.

Sept. 11-13—PACIFIC COAST GAS ASSOC. ANNUAL MEETING, Hotel del Coronado, Coronado, Calif. Contact Assoc. offices, 2 Pine St., San Francisco 11.

Sept. 17-21—AMERICAN SOCIETY FOR TESTING MATERIALS, 2d Pacific Area National Meeting and Apparatus Exhibit, Hotel Statler, Los Angeles. Contact Bert Folda, chairman, promotion and publicity committee, c/o General Petroleum Corp., Box 2122, Terminal Annex, Los Angeles 54.

Sept. 17-21—SYMPOSIUM ON RADIATION EFFECTS ON MATERIALS, sponsored jointly by Atomic Industrial Forum and American Society for Testing Materials, Los Angeles. Contact ASTM, 1916 Race St., Philadelphia 2, Pa.

Sept. 19-21—PORCELAIN ENAMEL INSTITUTE, INC., 25th annual meeting, The Broadmoor, Colorado Springs, Colo. Contact Porcelain Enamel Institute, 1145 19th St. N.W., Washington 6, D. C.

Sept. 23-29—NATIONAL ASSOC. OF ELECTRICAL CONTRACTORS, national convention, San Francisco. Contact Clint J. Harder, secretary-treasurer, 1200 18th St., N.W., Washington 6, D. C.

Sept. 26-28—AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS, third annual Rocky Mountain Minerals Conference, Newhouse Hotel, Salt Lake City. Contact R. B. Coleman, 600 W. 33rd St., Salt Lake City, Utah.

Sept. 26-29—NATIONAL ELECTRICAL CONTRACTORS ASSOC., convention, San Francisco.

Oct. 1-4—AMERICAN MINING CONGRESS (Metal Mining-Industrial Minerals Convention and Exposition), Shrine Exposition Hall, Los Angeles.

Oct. 16-18—35TH PACIFIC COAST MANAGEMENT CONFERENCE, "Building the Management Team," practical company experiences used to get strong team results on principal levels of management, Claremont Hotel, Berkeley, Calif. Contact California Personnel Management Assoc., 2180 Milvia St., Berkeley.

Oct. 31-Nov. 1—1956 WESTERN AREA DEVELOPMENT CONFERENCE, "Resources for Industrial Expansion" theme, co-sponsored by Stanford Research Institute and Confederation de Camaras Industriales de los Estados Unidos Mexicanos (a Mexican industrial association), Hotel Westward Ho, Phoenix, Ariz. Contact Charles L. Hamman, Assistant Director, Economics Research, Stanford Research Institute, Menlo Park, Calif.

Nov. 1-3—NEW MEXICO MINING ASSOC., convention, Carlsbad, N. Mex. Contact J. B. Knaebel, president, P. O. Box 1125, Santa Fe, N. Mex.

WESTERN INDUSTRY — July 1956

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Which is most important?

a pick-up unit for lifting
precast concrete walls,
or a swivel hook
for the Air Force?

neither

Both are equally important to us. The eye-bolt part of the pick-up unit and the swivel portion of the hook are examples of AmForge engineering and production. Whenever you have a forging problem, large or small, complicated or simple, AmForge is prepared with engineering assistance and equipment to produce many different sizes and shapes, either press or upset forgings. Please phone us collect when you have a "forging" problem. Phone: EDgewood 4-4931.

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155 N. WACKER DRIVE, CHICAGO 6, ILLINOIS
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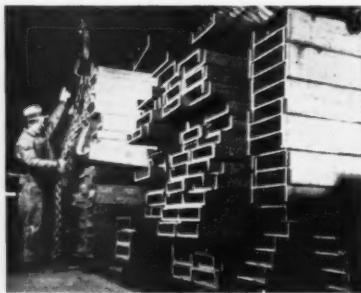
STEEL BUYERS GUIDE to Ryerson Products and Services

You can draw on your nearby Ryerson plant for an almost endless number of products and services—and the more you concentrate your purchases at one source, the more you save. Ryerson

products not pictured here include: Re-bars, expanded metal, grating, plastic pipe, machinery and tools, etc. See your Ryerson catalog for complete list and write for descriptive literature.



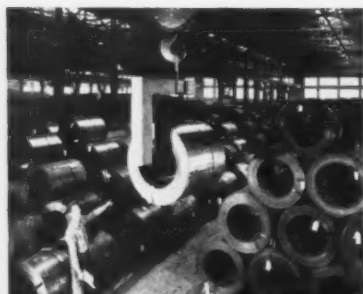
BARs—The most complete range of types, shapes and sizes as well as the largest tonnage.



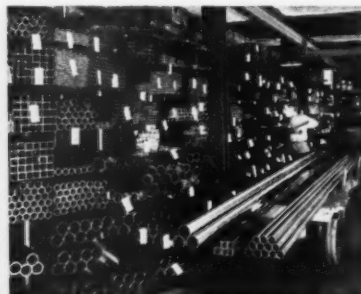
STRUCTURALS — I-beams, H-beams, channels, angles, tees and zees—all to ASTM spec. A-7.



PLATES—14 types including special low carbon plates for forming and welding, leaded E-Z-Cut, etc.



SHEETS & STRIP—More than 20 different types in pattern sizes, cut-to-order sizes, strip coils, etc.



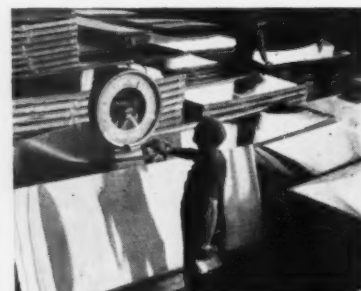
TUBING—Seamless and welded mechanical tubing, fluid power tubing, structural and boiler tubes, etc.



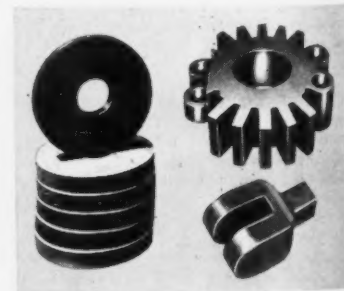
C. F. BARs—Cold finished steel for every use: screw steel, Ledloy, accuracy stock, machinery steel, shafting, etc.



ALLOYS—Every type including leaded alloys for fastest machining, all performance-proved by tests.



STAINLESS—Allegheny stainless in over 2,221 sizes, shapes, types, finishes: sheets, plates, bars, pipe, etc.



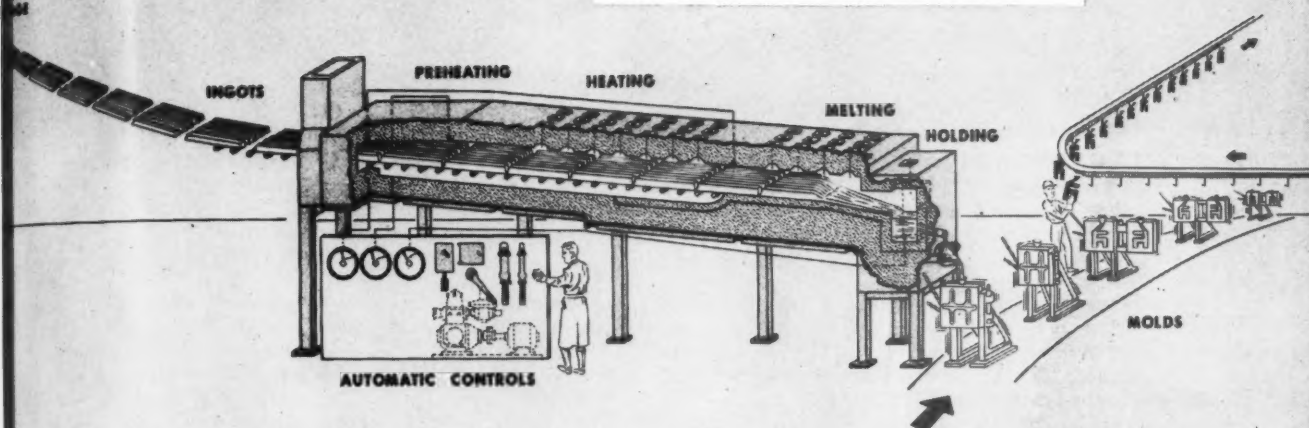
FLAME CUTTING—Almost any shape quickly cut from strong rolled steel—one or hundreds all alike.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC., LOS ANGELES—Plant: 4310 E. Bandini Blvd. Mail: Box 3817, Los Angeles 54. Phones: Angelus 2-6141, from San Diego (no toll) Zenith 6660. SAN FRANCISCO—Plant: 65th & Hollis Sts., Emeryville. Mail: Box 188, Emeryville, California. Phones: Olympic 3-2933, Douglas 2-4211. SEATTLE—Plant: 1200 4th Ave., South. Mail: Box 3525, Seattle 24. Phone: Seneca 2300. SPOKANE—Plant: North 207 Freya St. Mail: Box 2158, Spokane 10. Phone: Keystone 5-1581.

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WESTERN INDUSTRY — July 1956



TORCHLESS GAS BURNERS are increasing production rates, improving metal quality, and reducing fuel costs in new-type continuous high-speed units for melting aluminum ingots, shown here diagrammatically.

IN THE NORTHWEST:

New frontiers with natural gas

The Northwest will soon have a new choice of fuels—natural gas. With it will come entirely new industries employing processes and methods as yet unavailable to the area, and another round of industrial expansion for the West. Just as important will be the many opportunities for existing plants in the Northwest to use new or recently improved heat processes that result in product quality improvement, increased production, or reduction in unit costs. For the particular benefit of Northwest plant operating executives, these possibilities are outlined below in detail, based on a paper presented before the ASME in Portland this spring. It's a challenging checklist of ideas too for engineers and production men in plants all over the West who may not yet be using natural gas to best advantage in their plants.—Ed.

AUTHOR OF THIS ARTICLE



ROBERT C. LE MAY

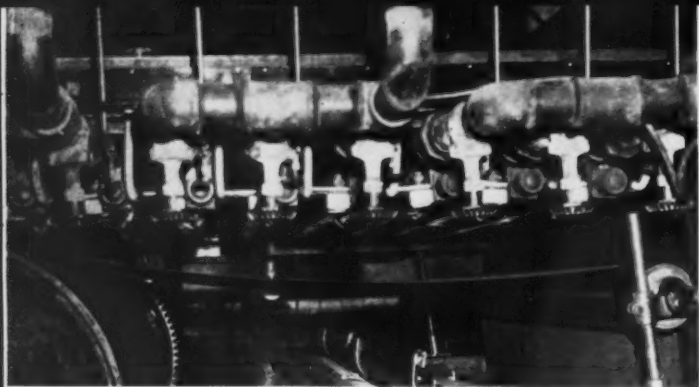
Selas Corp. of America
Philadelphia, Pa.

Bob Le May, Yale '32, has been in the gas business since graduation. He joined Selas in 1949, is now coordinating sales activities and serving as a working member on committees of the gas and gas appliance associations. Frequent visits to the West have provided him with a keen understanding of the region's needs.

REVIEWED HERE are a number of rather outstanding new or recently improved heat processes now employed in areas where natural gas is already in use, and which are now or should soon be of interest to Northwest engineers. Processes described have been selected to indicate some of the engineering and production gains that natural gas will make possible in Northwest plants.

It is believed that availability of large natural gas supplies will bring to the Northwest new industries which employ it as a convenient raw material. Such industries will probably produce ethylene as a petrochemical intermediate, anhydrous ammonia as a liquid fertilizer, and methyl alcohol. The demand for these products has been increasing so rapidly that such plants have been or are now being established in most areas where markets and adequate natural gas supplies are found together. There is no reason to expect that the Northwest will be an exception to this trend.

More than 80% of our ammonia is



RADIANT GAS BURNERS in transverse rows safely increase drying capacity of paper making machines. Many other web materials can be effectively heated by this method or adaptations of it.



TORCHLESS RADIANT GAS HEATING of portable varnish making kettles improves kettle life and quality of the varnish being manufactured. This also is a method with applications in many industries.

now produced from "synthesis gas" formed from methane—the principal constituent of natural gas. Carbon dioxide gas and "dry ice" are usually marketed as by-products and methanol synthesis gas is often made in the same plants. Ethylene, a most useful petrochemical intermediate, is made by thermally cracking ethane, propane, and butane stripped from natural gas.

Another popular use for natural gas as a raw material is in prepared-atmosphere generators. Such atmospheres may be used for metallurgical applications to prevent scaling or carbon loss during heating, or to facilitate controlled carbon addition to steels. Other gas-generated atmospheres are employed for reducing or eliminating undesirable oxidation in chemical plants, refineries and in food preparation. Appropriate atmospheres are usually prepared either by reacting natural gas with a slightly inadequate amount of air (exothermic) or with little or no air (endothermic)—in suitable high temperature chambers.

Applications in food industries

There are many heat processes where natural gas is employed because of its cleanliness, uniformity, and flexibility. These are best illustrated by applications in the food manufacturing industry. There, clean gas combustion products are not only harmless to, but sometimes actually desirable with, foods in process. This permits direct gas firing, where heated materials are exposed to combustion products. With this method, heating is more efficient than indirect applications where hot gases are excluded by partition walls.

One now popular industrial natural gas application is for direct firing cracker or bread baking ovens. As the result of frequent tests and experimen-

tation, oven designs have been evolved which are both attractive and efficient, and which produce consistently high grade products.

Because they are thus more readily transported, several basic foods are now powdered—by tray or spray drying methods. In such processes natural gas is burned in an upstream air heater to furnish clean hot gas for rapid moisture evaporation. There is little doubt that it will be employed for drying milk, eggs, coffee, proteins, or other powdered foods in the Northwest. Because of the large fruit crop there, fruit sections or slices will probably also be processed by exposure to hot products from natural gas-fired air heaters.

Control of flame geometry

Flame geometry is a relatively new term which has assumed greater importance as we have learned to increase control over flame shape, size, location, and stability. Improved means of geometric flame control represents another of the engineering gains available with natural gas. Exemplifying an application where this control is being effectively employed is a glass "fire polishing" where undesirable sharp edges are fused without changing ware shape.

The electronics industry has long employed geometric flame control in its glass working operations for fusing and forming large numbers of parts from tiny lamp bulbs to television picture tubes. Because of this need and the accuracy with which gas flames can be controlled, lamp plants will usually locate only where there is an adequate supply of gas.

A most critical heating process is that required to join aluminum parts by brazing. It is critical because the joint alloy melts at a temperature only slightly under that of the base ma-

terial, and pieces are quickly destroyed when any part of the assembly is heated to an excessive temperature. Several new machines are now available for joining aluminum parts on the production line. An example is a machine that enables one man to braze headers on automobile air conditioner heat exchangers at the rate of 100 ends/hr. Equivalent production with hand torches had previously required 8 to 10 men.

For silver brazing, more temperature tolerance is available, making that operation less critical. Consequently many automatic machines now burn natural gas and air to silver braze metal stampings, forgings, castings, and machined parts—employing unskilled shop labor.

Availability of "torchless" flames

Important engineering gains have been made in heat processing by the use of burners which force multiple radial flame jets against incandescent ceramic surfaces. In this process of conversion to radiant energy, the usual flame torch virtually disappears. Elimination of the torch-shaped flame makes it possible to employ this heat source in close proximity to work which would otherwise be damaged by local overheating.

Direct fired kettles for "cooking" synthetic or natural varnish have long suffered from uneven heating. Undesirable hot spots on kettle bottoms not only buckle kettles but add undesirable color to the product. Recently numerous varnish makers and chemical plants have installed so called radiant hearths beneath their vessels. Similar heat sources have been employed within enclosed settings, for critical jobs including preparation of atomic energy feeder materials.

A problem in nonferrous metal melting is hydrogen absorption, which

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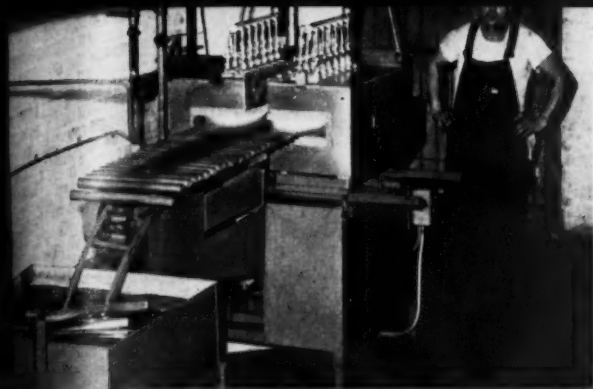
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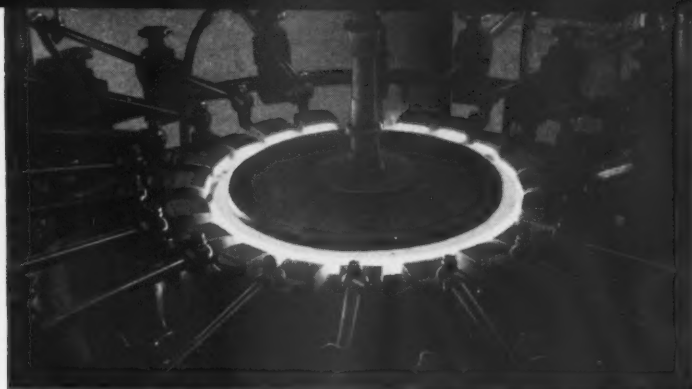
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COMPACT GAS-FIRED MACHINE anneals end sections only of brass tubing prior to bending. Furnace is divided to accommodate varying tube lengths used in the manufacture of sink trap fittings.



HIGH-VELOCITY BURNERS for gear tooth hardening are arranged so that all teeth are hardened simultaneously with low cost fuel and air, and with desirable hardness patterns without overheating other gear parts.

apparently increases with metal temperature, time of exposure, and with direct flame contact. Freedom from torching has permitted use of these radiant burners in close proximity to melting metal. This has resulted in increased production from existing furnaces, improved metal quality, and effected an unexpected reduction in fuel costs.

Another significant use of torchless burners is that in which they are placed directly facing the walls of galvanizing kettles. To avoid kettle burnout or overheating from flame contact, conventional galvanizing settings require space-consuming baffle wall or flame diversion. While both expedients increase over-all size and force operators farther from the molten metal baths, the use of torchless burners safely decreases size of the furnace.

The electronics industry exhausts its vacuum tubes and in doing so heats the tubes to drive off occluded gases. By employing torchless gas burners, it has safely placed economical heat sources around and very close to the glass tube walls. Electronics and electrical equipment manufacturing employ large volumes of industrial natural gas.

Use of radiant heat patterns

The natural gas applications described above were selected largely because torchless burners were important; these torchless burners are usually also radiant. Deliberate selection and arrangement of radiant heat sources can result in highly useful and controlled heat patterns. Appropriate patterns are employed in production to match and offset heat losses, or to match and supply heat requirements which differ from place to place over individual work pieces.

In addition to direct application of

gas burners, radiant patterns have also been established with internally fired steel or alloy tubes which operate at somewhat lower temperatures but which remove combustion products from work zones.

A simple radiant heat pattern is that employed to speed up drying near the wet end of a paper making machine. Often boiler capacity or space available for steam drums is limited, and an additional 10 to 20% of capacity can be added by employing an arrangement such as shown in the photo on page 32. Many other web materials are effectively and rapidly heated by variations of this method. These include high speed drying of ink, roofing materials, textiles, coated stock, and plastics. Usually, products of combustion are harmless to web materials so that direct firing may be employed with them.

Heat treating metal mill products

Basically similar to those employed for drying of web materials are the radiant heat patterns for heat treating metal mill products. This requires higher temperatures, however, so burners or radiant tubes are mounted on insulated ceramic panels.

By building radiant heat patterns into facing side walls, or by mounting radiant tubes upon them, several fast and highly successful continuous metal strip annealers have recently been built. Because continuous strand permits more uniform heat exposure without the usual "heat soak," the product is not only more uniform, but in several metals exhibits greater ductility of fine grained materials.

A California firm is one of several which has recently installed natural gas radiant roof equipment to anneal simultaneously and rapidly both ends of thin brass tubing for sink trap fittings. Here, heating must be suffi-

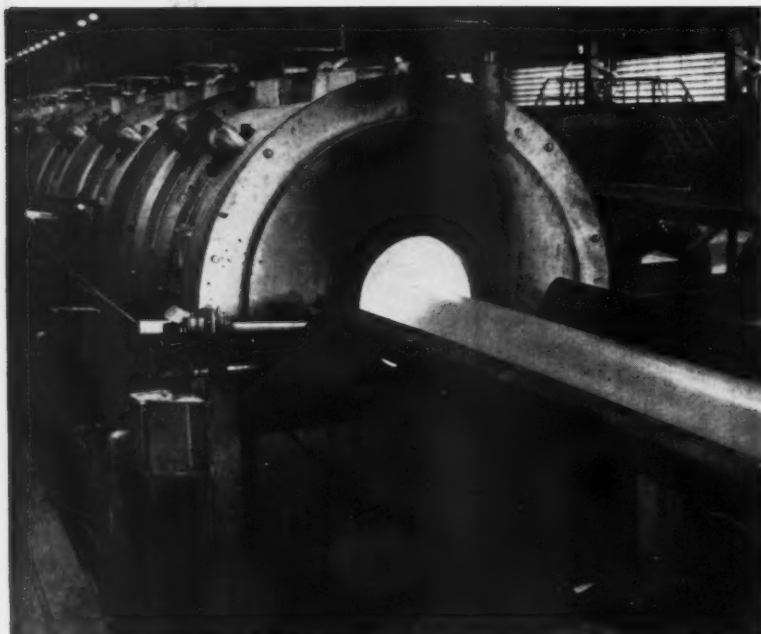
ciently precise to anneal the ends but leave central sections unaffected (Photo on page 33 shows the installation.) The furnace is divided to accommodate varying tube lengths.

Local radiant heating is now being effectively employed in another California plant for annealing mouths only of mortar shell cups prior to cold reduction of end diameters. By rotating parts on spindles before patterned radiant gas burners, it is possible to perform in two minutes an anneal which formerly required prolonged immersion in molten salt.

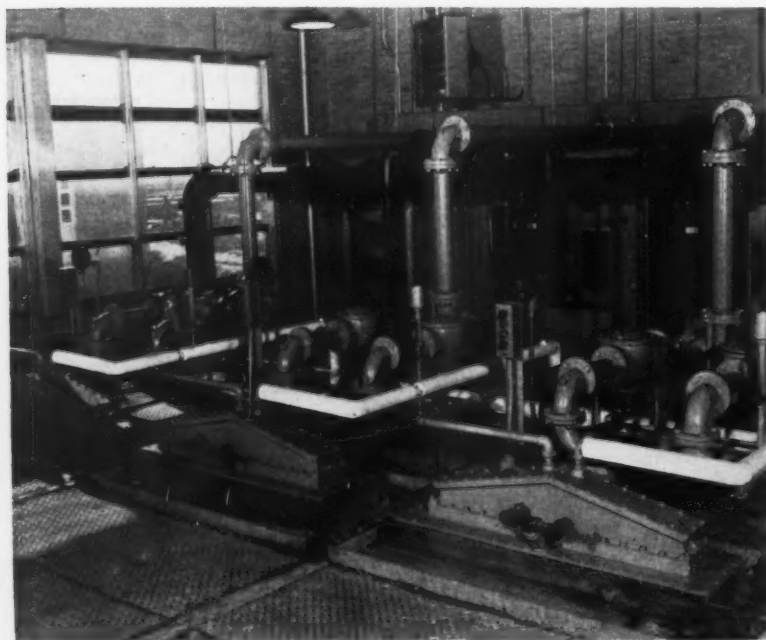
Large heavy metal parts are now being heat treated safely and rapidly by using natural gas radiant heat patterns so chosen that all portions of the load reach temperature at approximately the same time. Still larger metal sections are found in forming-dies for the so called "large press program." Each weighing several tons and used for forming airframe sections, the dies can be rapidly and satisfactorily heated by placing them between vertical radiant panels with heat patterns adjusted to develop temperature uniformity throughout the die. (One of several recently installed units is pictured on this month's front cover—Ed.) Somewhat similar equipment is employed to heat large panels of glass for tempering in vertical position, this glass tempering operation constituting one of the most critical of all process heat applications.

High intensities and velocities

Industrial gas burners are now being used which release heat at rates of 25 to 50 millions of Btu/cu. ft./hr. This degree of intensity, coupled with directional control of hot gases flowing at or near sonic velocities, gives the engineer a highly useful heating device. Such burners are available in



WELDED STEEL PIPE leaves gas-fired normalizing furnaces at production line speeds. Strip is converted to finished pipe during continuous movement. Some 3,000 lb. of welded pipe is normalized per hour.



DIRECT HEATING of liquids flowing beneath this natural gas-fired unit is accomplished at a rate of 2MM Btu. per hr. by each of three submerged combustion burners which force burned gases through passing liquids.

a wide range of sizes, and can be shaped to work-piece contours.

There is at least one type of application where high velocity burners perform the simultaneous functions of heating, forming, and delivering a

product. They are thus regularly employed in the manufacture of "super-fine" glass fibers, a relatively new product made possible by this heating process.

Intensity of heat application is

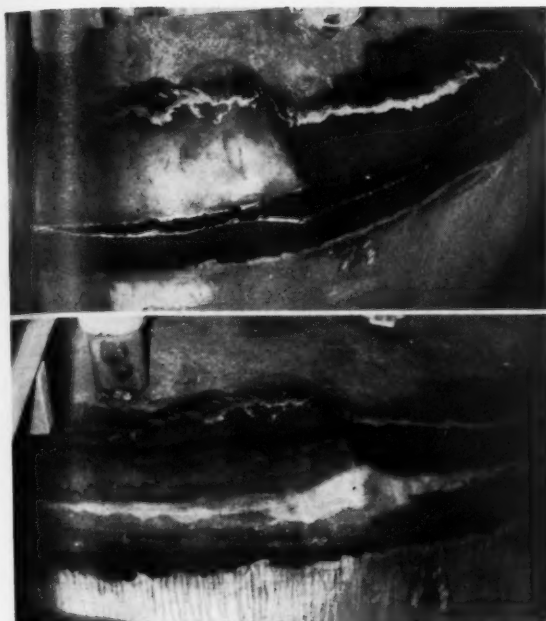
being increased with other techniques. One of these employs high thermal differentials between work piece and heat source temperatures. Thus high speed gas heating for forging conveys work pieces through small and closely confined high temperature chambers. An example is a curved furnace automatically feeding aluminum blanks to an impactor making 2,400 rocket fins per hour. Not only are undesirable metal scale and decarburization minimized with the use of high speed gas heating, but in many cases improved hot metal flow results. A larger recent installation has not only lowered work temperatures by 200 to 300 deg. F., but resultant metal loss savings have actually permitted the utilization of smaller billets for shell forging.

Production line integration

Throughout high production areas, there has been much talk of automation in industry, and a basic characteristic of this is to integrate as many operations as possible with main production lines. The arrival of natural gas will increase the availability of heating equipment for complete or partial integration. Illustrated on this page is a high speed "barrel" furnace line for normalizing 3,000 lb./hr. of electrically welded steel pipe with automatic handling, where strip is converted to finished pipe during continuous movement. (It is understood that arrival of natural gas is bringing new pipe mills to the Northwest.) Use of two of these barrel furnace lines, with quench and automatic transfer between them, has permitted hardening and tempering of oil well casing to produce with carbon steels physical properties which formerly required expensive alloy materials.

Boost for automatic operations

Plants processing chemicals have long made extensive use of automation. For direct heating of flowing aqueous materials and other liquids unaffected by introduction of combustion products, there have been developed submerged combustion burners which force burned gases below the surface and up through passing liquids, with beneficial agitation. Some of these are available for heating corrosive materials. A recently developed unit employs a combustion chamber above the liquid level and forces only completely burned gases into actual liquid contact with resulting thermal efficiency of approximately 90%.



CORRODED AREA was first cleaned and sanded . . . **THEN, THREE "GLASS" PATCHES** were applied and allowed to harden in sunlight. When hard, patches could not be jarred loose with hammer blows.



SAME "GLASS" is used to line storage tanks to prevent deterioration from corrosion, even when caustic solutions are stored in them. Heat lamps can be used to hasten hardening of the "glass."

"Plastic surgery" repairs tanks

A NEW PLASTIC, epoxy resin, and Fiberglas now make it possible to repair industrial tanks and pipes on the spot, while in use, without welding. The economy of such repairs is indicated by the photos at left above, showing a typical tank mending job in which the total cost of the resin and glass fabric was less than \$18. The same tank storing corrosive chemicals for McGuire Industries in Oakland, Calif., was repaired previously by conventional methods at a cost of about \$900.

According to Taylor & Art, Inc., of Oakland, a typical Western supplier of the materials you need for such repairs, epoxy resin bonds permanently to all metals as well as other materials. When reinforced with glass fabric, it has strength equivalent to that of metal with much less weight.

Like other liquid plastics used with glass fabric, epoxy resin hardens to a solid when mixed with its "catalyst" or hardener. It is, however, the only resin which will adhere to metal satisfactorily for industrial use. Other resins previously developed for use with glass fabric will bond success-

fully to wood and other non-metallic surfaces but not to metal. Epoxy resin is the first plastic with a molecular structure that has demonstrated an ability to link permanently with metal molecules.

Since it is easy to apply and low in cost in comparison with conventional repair methods, epoxy resin is finding a growing use in all types of around-the-plant maintenance, particularly in

pipe and tank repairs. Repairs on tanks and pipes used for the storage of inflammable liquids and gases can be carried out with complete safety on location and without the necessity of removing the equipment from operation.

The essential steps for repairs with these new materials are:

1. Clean the surface to be patched thoroughly.
2. Cut sufficient Fiberglas patches to provide the patch strength required (three or four layers are generally adequate).
3. Mix the epoxy resin with its hardener, according to formula.
4. Impregnate the glass patches in the resin-hardener mixture.
5. Apply the glass patches, one at a time, to the damaged area.
6. Allow them to harden (a heat lamp speeds up hardening).
7. If a smooth outer finish is desired sand down with sanding equipment.

Small patches can be made with a paste of epoxy resin and granulated metal. This can be applied with a putty knife to fill small holes and pits and to fill seams or cracks. Latest paste-type solders can be sawed, drilled, and tapped.



TYPICAL REPAIR KIT sells for about \$25, and contains Fiberglas cloth in sheet and tape form, chopped Fiberglas fibers, resin and hardener, epoxy paste, and mixing cups.

Predetermined motion-time data

Predetermined data systems are new and controversial. Here is a report after 5 years of application in a Western plant.

IN recent years the field of industrial engineering has been besieged by a number of predetermined data systems, each with a battery of startling claims. As with the advent of any new method or technique, suspicions were aroused and general acceptance was slow. However, after evidence of its successful application was demonstrated, numerous companies tried it out for themselves.

Today, companies representing many major industries are using one of the techniques of predetermined data to assist in the simplification and standardization of work methods, to set time standards, to establish standards, to establish standard time data, and for a host of other purposes.

Let's define it

So that we may know just what is meant by the term "predetermined motion-time data" in the sense that it is referred to in this report, the following definition is offered (as stated in the book *Methods-Time Measurement* by Maynard, Stegemerten, and Schwab):

"A procedure which analyzes a manual operation or method into the basic motions required to perform it and assigns to each motion a predetermined time standard which is determined by the nature of the motion and the conditions under which it is made."

Contained in the definition is the implication that it is possible to determine, after proper analysis, the

basic motions required to perform a manual operation. While, in our opinion, this is still not entirely possible, it is significant that certain basic principles have been established.

Let's examine it

Let's examine the technique by analyzing a simple work element. A brief description of the element is:

"Obtain two attach plates and position on table top."

The "obtain" involves reaches of both hands to the opening of the tote pan (See picture 1). At this point one hand first picks up a cradle (2), followed by the other hand (3). The motion-method is recorded on a "methods analysis sheet" as follows:

Left Hand	Symbol	Time	Symbol	Right Hand
Reach 11 in. to opening of tote	R11B	14.2	R12C	Reach 12 in. to tote pan
Wait for RH		9.1	G4B	Obtain (1) plate
Complete reach for plate	R1C	3.6		
Obtain (1) plate	G4B	9.1		

This is followed by the "positioning" of the plates by moving them with both hands to the area (4). One hand completes the positioning first (5), followed by the other hand (6) as follows:

Left Hand	Symbol	Time	Symbol	Right Hand
Move cradle 11 in. to approx. area. Orient in hand	M11B	15.2	M12C	Move cradle 12 in. to aligning pos. Orient in hand
Wait for RH		16.2	P2SE	Align cradle
Move cradle 1 in. to align pos.	M1C	3.4		
Align cradle	P2SE	16.2		
Release cradle	RL1	2.0	RL1	Release cradle

In this illustration the principles of simultaneous motions (principles that determine when motions can and cannot be performed at the same time) and overlapping motions, which allow the natural, rhythmic performance of motions that must be staggered, were applied to construct the motion-method. In all cases the principles apply to govern motion pattern construction so that the method can be performed by the average, experienced worker. The method was precisely determined after the following conditions and dimensions were known:

1. The distance from the starting point of the hands to the tote pan.
2. The condition of the parts in the tote pan (in this case jumbled).
3. The dimensions of the parts in the tote pan.
4. The distance from the tote pan to the aligning points on the table top.
5. The accuracy of the alignment involved in locating the plates on the table top.

It is noted that each of the factors above is expressed either by dimension or other recognizable characteristics. These factors, in essence, determine the method and the time standard.

Same principles apply

While the illustration is a simple one, the same principles apply to more complicated work requirements. The important consideration is that for the most part, methods and time standards can be established on the basis of certain known dimensions and characteristics—on the basis of causes instead of effects. With this point established, many other possibilities naturally follow, such as: influencing design of

AUTHOR OF THIS ARTICLE



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Chief Industrial Engineer
Virtue Bros. Mfg. Co.
Los Angeles, Calif.

Bob Edgecumbe has spent 15 years in the fields of industrial engineering and industrial relations in the West, with manufacturing firms and as a management consultant. He was one of the first on the West Coast to be trained in the use of predetermined data, and has been a constant speaker on the subject before technical society groups. "Almost a crusader," he says.

tooling, design and types of materials, predetermining workplace layouts.

In our opinion, the "engineering" of motion-methods is the *most significant contribution* of the predetermined data approach, and in our case has proven to be of inestimable value.

Range of application

Now that we have examined the basis of the predetermined data techniques, we can consider other points of controversy. In our experience, up to now, there seems to be no limit to the range of application of the predetermined data. This can be illustrated by listing some of the operations in our own plant. Job types range from light assembly operations, to heavy wood and metal working of furniture parts. Weights and forces ranging up to 150 lb. are involved. In addition, operations involving metal plating, polishing, and wood finishing have been standardized.

Each of these jobs was subsequently placed on a wage incentive basis. Easy-to-apply standard data were developed from predetermined data to establish methods and standards on new products introduced into the line, and to maintain methods and standards on operations presently in effect.

Our latest applications include the entire shipping operation, office and machine accounting operations. At present our coverage is approximately 95% of the direct labor force, in a plant employing close to 500 direct labor employees.

Short runs

Although most of the direct labor operations in our plant are repetitive in nature, and job orders are consistent and high in volume, there is increasing evidence that predetermined data is proving of equal if not greater value in determining methods and standards on low volume, job shop applications. The short run problem calls for standard data that can be simply and quickly applied to cover a situation that is highly variable and low in volume.

The basic reason for the success of the predetermined data approach in this area is that it is *not* necessary to actually observe the entire range of operations—dimensions and operational characteristics allow accurate standards construction. This cuts the engineering time to construct standard data to a fraction of that previously required, and allows the flexible, more universal approach that the short run, job shop type of manufacturing requires.

How about time standards?

Mentioned previously was the fact that we have in effect a wage incentive plan for our factory personnel. There is no more rigid test for time standards than is offered by wage incentive application. With few exceptions, all direct labor employees are covered by the plan.

All process or machine-controlled work standards are set by conventional stopwatch study. The reason for this is because the data must of necessity be limited to manual work only.

All of the manual work methods and time standards are set by predetermined data. You have probably noted that we usually preface the term *time standards* with the word *method*. This is because the time standards are really a by-product, of natural consequence, with the use of predetermined data. As stated in the definition, the *time standards are based on the method*, and once methods are established the time standards are simply read from the established data.

Maintain standards

This means that it is possible to maintain time standards on the *basis of method*. It has been stated by authorities in the field that the primary cause for the failure of most incentive plans is due to inability or neglect in the maintenance of methods and standards. It is also significant that most of the "subtle" methods changes that take place occur without our being aware of it. In the past, we simply did not have the means to detect and measure them. By reference to the first simple illustration it can be seen that any minor change in work place layout, tools, materials, tolerances, etc., can be detected and subsequently revised.

Insight into methods

This also means that the possibilities for methods improvement are inexhaustible—methods and standards can be dealt with on a dynamic basis, without the problem of complete restudy and complaints of "cutting rates."

It is our opinion that for the most part methods and standards in our plant are "in control," and instead of the usual deterioration, are gaining stability as time goes on.

Employee reactions

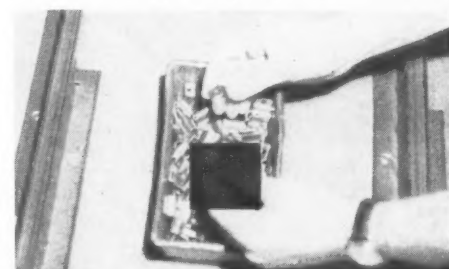
This leads us into the area of what the employee thinks of the technique. When the technique was introduced



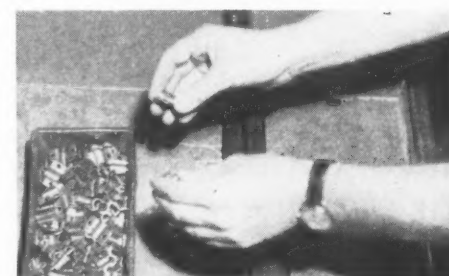
1—Both hands reach to tote pan.



2—One hand picks up a cradle.



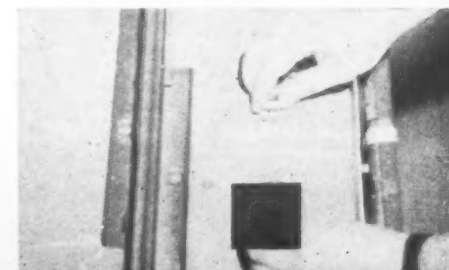
3—Other picks up a cradle.



4—Move to positioning area.



5 & 6—Hands position cradles.



Range of application of predetermined data at Virtue Bros.



Sewing chair covers



Polishing tubing



Loading cartons into boxcars



Keypunch data work



Alphabetizing documents



Operating rip saws

into the plant we took great pains to inform the employees, in groups, of just what effect this would have on them and their jobs. Educational programs were conducted, and employees, in many cases, participated in the methods analysis on their own jobs. Our entire time standards policy and guarantee was revised on the basis of the use of predetermined data. We proceeded on the basis that the employee must be the primary consideration. With this in mind, the following three factors were musts:

1. The method's must be set in consideration of the normal physiological functioning of the worker. (This is, for the most part, assured by the proper application of the technique). They must promote a natural, rhythmic, and safe way of performing a task.

2. Necessary training and encouragement must be afforded the employee until he is satisfied that the methods and standards are fair and equitable under average conditions.

3. Methods and standards must be maintained in order to incorporate methods changes, as long as the changes in method satisfy the requirements of No. 1 above.

Employees in favor

On the whole, the employees are in favor of the technique for the following reasons:

1. The consistency of standards is much improved. (This is to be expected due to the nature of the technique).

2. They like the idea that they receive the same standards for like motions as other employees, under the same conditions.

3. The objective manner in which standards are maintained. Only those motions which are affected by a change in method are revised, thereby leaving the rest of the standards intact. Also, reasons for change can be objectively presented, i.e., dimensionally, or other identifiable characteristic.

Is the technique expensive?

This question presents difficulties because it is hard to relate our industrial engineering program today with that of five years ago, since the extensiveness of methods work has been so radically changed. However, it can be estimated that constructing standard elemental data for an average operation today takes approximately 75% of the time formerly consumed using stopwatch methods. The primary reason for this is that, during the initial analysis using stopwatch methods, often painstaking work had to be scrapped, reanalyzed and restudied due to an erroneous assumption concerning a work variable.

With predetermined data, the possibilities of misjudgments are in the first place reduced, and, even though they should occur, it is only a matter of further subdivision of the work variable, with no reworking. While this may seem to be a fairly technical phase of the methods and measure-

ment procedure, this problem almost invariably occurs, and must be reckoned with—it takes engineering hours.

In the maintenance of standards, it is a matter of one technique (predetermined data) being able to quickly and simply cope with the problem, and the other (stopwatch) affording a cumbersome approach. As previously mentioned from the standpoint of incentive application, the ability to maintain methods and standards adequately is what will keep a plan dynamic and alive.

In considering the relative costs of methods of study it is also important to consider many intangibles such as quality of methods and measurement, extent of methods improvements, employee satisfaction, and many more.

There will be some criticism and, no doubt, growing acceptance of predetermined data techniques in the years to come. We certainly hope that, in spite of controversy, research can be intensified to add to and improve the existing techniques. Certainly if this very fundamental function of industrial engineering is to approach the scientific, and the responsibility for methods, time measurements, and wage administration are to be adequately fulfilled, all avenues must be investigated. It is this writer's opinion that predetermined data is a big step toward this attainment.

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Revolving grab attachment picks up paper rolls . . .

Revolving grab attachment moves paper rolls faster

MANEUVERING sulphite paper rolls weighing as much as 6,000 lb. from operation to operation at Crown Zellerbach Corp.'s Lebanon, Ore., plant is handled with ease by a revolving grab lift truck attachment.

The bulky and unwieldy paper rolls are transported from winding machines to weighing scales, to storage, and finally to outgoing rail or truck facilities. Removed from the winding machines in a horizontal position, the rolls are maneuvered along their 150-ft. journey by a 6,000-lb. capacity Hyster lift truck and its attachment. Average time for the journey is 4 min.

Rolls are usually moved at floor level, but when storage conditions become cramped the rolls are stacked higher than one-deep.



Transports them to scale in horizontal position . . .



Then revolves the roll during trip to storage area . . .



Stacks them in vertical storage arrangement . . .



And can meet either-position loading requirements.

POOR MAN'S AUTOMATION

at Friden Calculating
Machine Co.
San Leandro, Calif.

First of a continuing series showing how on-their-toes Western plants are boosting production with smart but simple operating ideas.



SCREEN-BOTTOMED PANS were shaken by hand previously to separate tumbler-sawdust from parts.



NOW AUTOMATIC SEPARATOR does the job with a pulsating screen powered by a 1/4-hp. electric motor.

1. Machine replaces hand shaking

PARTS that have been tumbler-finished at Friden are removed from the tumbler covered with fine sawdust in which they are revolved during the finishing. Separating the parts from the sawdust was, until an employee suggested and built a machine to handle the job, a tedious and irksome task. Workmen stood before

a huge bin topped by ledges which held heavy wire-mesh baskets containing the sawdust-laden parts. They shook the baskets back and forth by hand and the residue fell into the bin below leaving the clean parts in the wire baskets.

This, besides being time consuming, filled the air and covered the workers

with dust. Chris Salviero, who is in charge of the department, decided a machine could be designed and constructed to handle the job and eliminate the two bad factors in the operation.

When he explained his idea to factory manager Roy Renholtz, Salviero got the green light on the project and he discussed design of the machine with Pat Gennoy, machinery maintenance foreman. The machinery maintenance foreman drew up the design and it was constructed by Friden machinist George Weber.

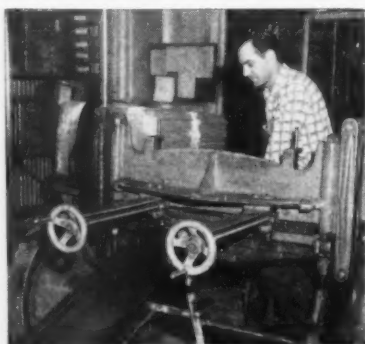
Powered by a 1/4-hp. electric motor, the wheelbarrow-like machine stands on angle iron legs. A screen within the separator device pulsates back and forth accomplishing the same operation that was formerly done by hand. A pan below the screen can be easily removed to empty the residue collection.

Another advantage built into the machine is its low construction which makes it possible to fit the separator directly beneath the tumblers. Parts are emptied into the separator from the tumbler and, in a matter of seconds, removed sawdust-free.

2. Shearing time cut, accuracy increased by chutes and gages

TWO suggestions submitted by Juan Hernandez, employee in Friden's raw materials processing department, have greatly reduced time consumed in shearing metal strips and increased accuracy.

One of the many jobs in the raw materials department is to cut strips of metal for punch press purposes. Square pieces formerly were cut on a shearing press and fell to the floor. They were collected after a cutting by the press operators. Hernandez' first suggestion involved the design of a chute which collects the cut material. Once installed the chute enabled one operator to easily pick up the stock



CHUTE installed on this shearing press facilitates collection of parts.

and stack it quickly.

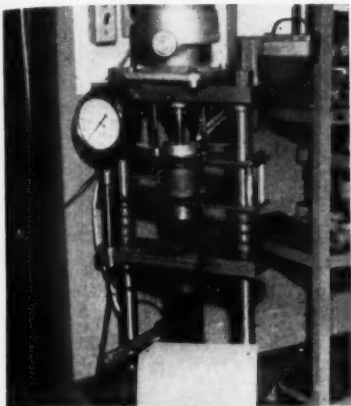
His second idea was the design of a gage which fits on the cutting shear and provides extra safety, ease, and insured accuracy in handling long pieces of metal. Formerly long pieces of metal were scribed and fed into the shear, but the scribe was difficult to



INSURED ACCURACY and safer operation were obtained from this set of gages.

see and line up accurately in the shear. Hernandez' set of gages covers a graded range of lengths running from 1 1/8 to 4 5/8 in. A clamp on feed arm extensions is set at the end of the desired gage blank and strips are fed with the clamped marker as a pre-set guide to strip length.

3. Small plastic press saves time



PLASTIC PRESS is composed of an air cylinder and a heating unit.

A PORTABLE plastic press at Friden Calculating Machine Co.'s San Leandro, Calif., plant is saving production time by freeing larger injection molding equipment to uninterrupted production of high-quantity runs of plastic parts and eliminating a movement bottleneck. The operation involved is forming and affixing the Friden name to calculating machine covers. Previously, machine covers were moved from the paint shop to the plastics' department at the other end

of the plant, other plastic fabrication work was halted and the names were affixed to the covers by large injection molding machinery.

The new portable press now does the job right in the paint department with almost as much speed as larger presses. The system involves only an air cylinder and a heating unit. The plastic is heated to a molten state in the heating unit and the cover is placed over the name die in the press. Pressure is then applied by air cylinder to bring the heating unit, cover, and die together. Molten plastic flows out into the die cavity pressure-forming the name.

The test model of the press proved so successful that improved and permanent models are being built. These will be equipped with pressure and temperature gages and quick loading features that will bring one-cycle time on the operation down to about 1 min. per cover.

One of the new portable presses will be shipped to Friden's Holland plant where no other plastic fabrication facilities exist. Previously names damaged during shipment were repaired in the Holland plant—a time consuming operation.



FEEDING SMALL GEAR RINGS into grooving machine by foot-pedal has reduced operator's labor by 33%.

4. 33% less work with foot-pedal feed

LABOR involved in machine-cutting an identification groove in 95,000 small gear rings was reduced by 33% in Friden's driftmeter section recently by converting the machine to a foot-actuated operation and freeing the hands of the machine operator to guide the pieces into position. The change was the product of a suggestion and design submitted by Don Rodgers, an employee in the section.

The foot actuation mechanism consists of a rope connected to a foot pedal and threaded through pulleys to the machine handle. Previously, the operator picked up the gear, placed it, and then pulled the handle downward to bring the cutter against the part. Now he merely picks up the part with the left hand, places it with the right, and steps down on the foot pedal. After grooving, the part falls off into a metal chute and into a container.

Speed in this operation was so greatly increased that operators found it necessary to wear a metal finger guard in case the foot was faster than the guide hand.

EMPLOYEE NO.	EMPLOYEE NAME	DEPT.	DEPT.	OPERATION	STANDARD	%	HOURS
FRIDEN CALCULATING MACHINE CO., INC.	ORDER NO.	PART NO.	PIECES GOOD	OPER. CODE	STANDARD HOURS		
	ORDER NO.	PART NO.	PIECES GOOD	OPER. CODE	STANDARD HOURS		
	ORDER NO.	PART NO.	PIECES GOOD	OPER. CODE	STANDARD HOURS		
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	ORDER NO.	PART NO.	PIECES GOOD	OPER. CODE	STANDARD HOURS		
TOTAL HOURS							

5. Pre-processed job cards slash costs

PRODUCTION cost control at Friden Calculating Machine Co. has been simplified greatly by a new system utilizing pre-processed job order cards. Results of simplification: 7 hr. per week saved.

Plant production people use job cards to maintain accurate time and order number records on all work done during any given shift. Forwarded to the plant's tabulating de-



ADD PUNCH MACHINES, a Friden product, are used to record job card data.

partment, the cards are used to obtain cost control data. The pre-processed cards that have simplified the system

are printed with name, department, and employee number by running them through a machine against master or permanent cards. This task is performed at the rate of 100 cards per min.

Time data and job numbers, which production workers pencil in on the cards as they proceed from job to job, are recorded by add punch machines, one unit of the Friden line, in the tabulation department, eliminating the need for key punching the information because the Friden add punch machine automatically enters data on a five-channel coded tape and the tape is fed through a tape-to-card converter for permanent recording.

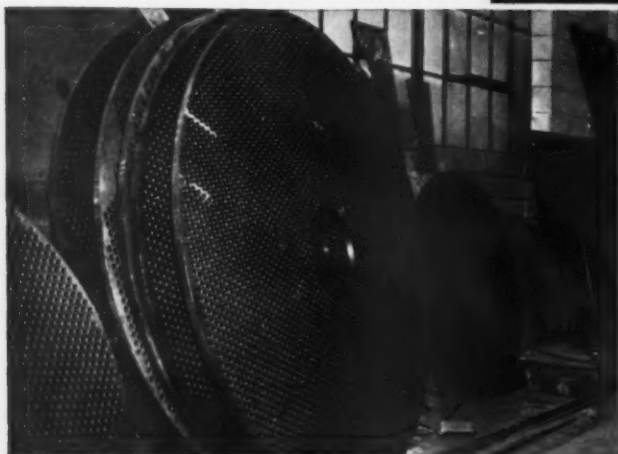
World's



BATTERY OF CLEAVER-BROOKS EVAPORATORS IN ACTION—Revere Silicon Bronze was chosen for these evaporators and their component parts because of its high corrosion resistance and non-contamination properties, great strength and weldability. All of the components, as well as the 4 evaporator shells, are made of Revere Silicon Bronze Alloy No. 420.



ONE OF THE 4 EVAPORATOR SHELLS made of Revere Silicon Bronze, fabricated and installed by CLEAVER-BROOKS MFG. CORP., Waukesha, Wisconsin.



EIGHT TUBE SHEETS LIKE THESE were used in the Bermuda installation . . . 2 per evaporator. Each tube sheet, made of Revere Silicon Bronze, is 86" in diameter, 1 1/4" thick and weighed approximately 1,360 lbs. after drilling.

Largest

VAPOR-COMPRESSION SEA WATER DISTILLATION PLANT

Made and installed by **CLEAVER-BROOKS**

... Vital distillation units fabricated from
REVERE SILICON BRONZE

This plant installed at the Kindley Air Force Base in Bermuda has a total daily capacity of 200,000 gallons and eliminates the dependence of the Base on rainfall or shipment of water by tankers.

Distilled water is produced in the ratio of 300 lbs. to each pound of Diesel fuel. Total costs are estimated at \$1.25 per thousand gallons of distilled water. Nearly every component part made by Cleaver-Brooks is about twice the size of its largest previous counterpart. For example, the evaporators are 16½ feet high. Each, with its component parts, weighs approximately 40,000 lbs., the empty Revere Silicon Bronze shell alone accounting for 28,000 lbs.

There is an interesting story behind the development and manufacture of this equipment. The four huge pressure vessels had to be fabricated of Revere Silicon Bronze Alloy No. 420. Knowing Revere's wide experience in welding copper-base alloys, Cleaver-Brooks called in a Technical Advisor, and gave him a complete set of blue-

prints of the vessels, with a request for suggestions regarding joint design and welding techniques. He in turn consulted the Welding Section of the Revere Research Department. Their recommendations were adopted, and the customer reported that the original estimate of welding time had been cut considerably, reducing production costs correspondingly.

The Revere Technical Advisory Service is glad to collaborate on problems involving the specification and fabrication of copper and copper-base alloys, and aluminum alloys. See the nearest Revere Sales Office.

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

Mills: Baltimore, Md.; Brooklyn, N. Y.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Newport, Ark.; Rome, N. Y. Sales Offices in Principal Cities, Distributors Everywhere.

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THE STEAM SEPARATORS are identified by their conical tops and directional vanes. They are of the cyclone type, which is a patented feature of CLEAVER-BROOKS evaporators, and remove entrained water from the steam, thus preventing contamination of the fresh water coming from this unit. The result is an extremely high purity of the fresh water product.

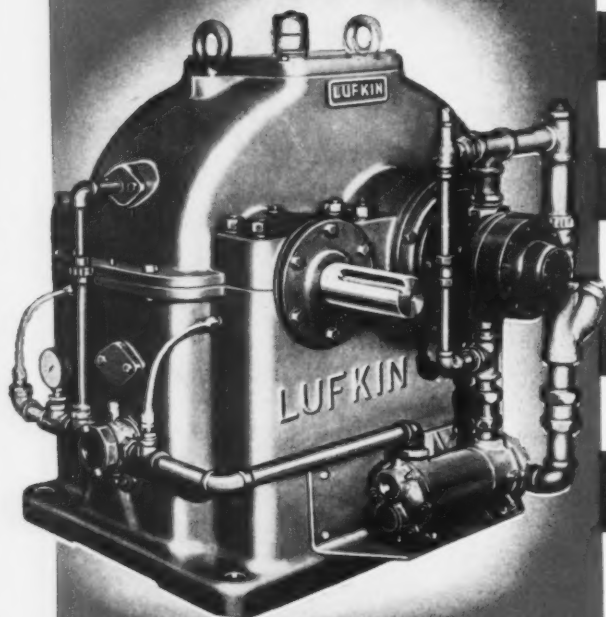
The rectangular objects at rear of photograph are the "Downcomers" which bring water down from the top of the steam separator. The tubes in left foreground are "Hotwells," which receive the distilled water discharge from the evaporator shell.



... for more details, circle No. 24 on Reader Service Postcard

Lufkin

HERRINGBONE GEAR SPEED REDUCERS AND INCREASERS



LUFKIN, TYPE N "HIGH SPEED"

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3 TO 2000 H. P.

ANY SPEED

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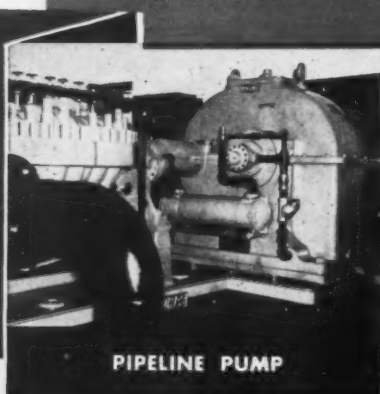
ANY RATIO

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ANY JOB

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WESTERN INDUSTRY — July 1956



TUMBLING HIDES being cured in drums (above) put intermittent and starting strains on drive equipment causing breakdowns and slippage until "dry" fluid drive unit (bottom center at left) was installed to absorb shocks.

"Dry" fluid drive tames jerky load

STARTING the rolling motion of tanning drums at Manasse Block Tanning Co.'s Berkeley, Calif., plant—where several hundred hides are tanned each day—put such a strain on drive components and subjected them to such a heavy chattering or jerky-load effect that speed reducers, sprockets, and couplings were being worn and broken at short and regular intervals. Furthermore, an excessive amount of power was required for the 15-hp. motor to get the hide and tanning liquid-laden drums into motion and the strain produced was elongating holes for bolts that hold the drum drive-sprocket and producing leaks.

That's a pretty black picture when you look at it through the eyes of the plant maintenance man who has to, among other tasks, keep three such drives in operating condition. However, a dry fluid drive has removed each of these problems.

Here's the drive set-up as it was before adding the dry fluid drive: a 15-hp. motor provides power through multiple V-belts and sheaves, a 13:1 speed reducer and a pin and cotter chain drive to a 5-ft. sprocket bolted to the drum head. End drive is about 18 rpm. The interior surface of each of the three tanning drums is fitted with pegs. A combined weight of 3,000 lb. comprised of hides and tanning liquor is placed in the drum prior to starting. The operator must jockey

the drum door into position by starting and stopping the drive in order to load the units.

Once started, the hides are carried part way around the drum cycle by the pegs. Then, falling from the pegs, they drop back to the bottom of the drum causing further jerky operation.

Manasse Block installed one Dodge Flexidyne, a dry fluid drive, on the most troublesome drive as a test. A measured amount of minute heat-treated shot acts as the flow charge in the unit. Contained in the housing, which is keyed to the speed reducer shaft in this case, the shot—termed flow charge—is thrown by centrifugal force to the perimeter of the housing where it interlocks between housing and undulated disc, which transmits power to the load.

Added to the drive at Manasse Block, the fluid drive permits the motor to reach full rpm, before actually "taking hold" on the load imposed by the tanning drums. Thus, the fluid drive unit absorbs the starting shocks and provides a smooth operation. It also takes up the in-operation shocks caused by the hides falling to the bottom of the drum.

It didn't take long for maintenance personnel to realize they had found the answer to their breakdowns and they soon added a fluid drive to each of the other two drives causing trouble in the plant.

GEAR FOR INDUSTRY
THE Lufkin LINE
OIL FIELD PUMPING UNITS

TREATIS EPICURUS

Not to be found in "Duncan Hines' Encyclopedia of Gastro-nomical Delight," as one of America's foremost places of Epicurean Paradise, is Union Oil's Stearns Park Barbecue Pit.



V. J. Fawcett

Here on these hallowed grounds located in Brea, California, nestled in among the scented Eucalyptus and the spicy pepper trees, Union Oil's Supervisory Field Force have for years presented their finest culinary masterpieces and hosted the Petroleum Equipment Manufacturers' Representatives — characters otherwise known as "Oilfield Peddlers" at their annual Salesmen's Barbecue.

Truly a gourmet's Shangri-la, Salesmen are known to drool uncontrollably at the mere mention of these feasts even months before the event takes place. Here the spicy scent of the Eucalyptus and the eagerness of the Epiglottis join forces to enjoy the results of careful preparation by such experts as Otto Gillingham, Tal Ledbetter, Lou Kelsey and T. R. Tinker, Chief Supervisory Steak Scorcher.

To tantalize the palate and tickle the tummy with stimulating thirst quenchers were Beverage Dispensers Jack Bailey and Ben Gage.

Practically emerged in pots of bubbling baked beans were Bean Dippers Ed Fitzgerald and Charlie Allaire.

One outstanding Bread Chopper was Jim Watson — wielding the Sheffield with the skill of a seasoned guillotinist.

Fred Geddes and Carl Bowden, Assistant Steak Scorcher and Salad Hacker respectively, contributed their skills together with many others to make May 17th a Union Oil "Red Letter Day" on the Epicurean Calendar.

V. J. Fawcett

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... for more details, circle No. 26 on Reader Service Postcard

Worn sheaves can ruin new V-belts

WHEN multiple V-belts have served their expected life, respective sheaves or pulleys will be from one-half to fully worn out, report belt engineers of the Thermoid Co. Prior to belt replacement, there are several points that should be observed.

Installing new replacement belts on badly and unevenly worn pulleys will drastically reduce life expectancy of belts. Best practice is to replace pulleys when the belts are replaced, but in all cases the pulleys should be examined for roughness in the grooves.

To check for uneven groove wear, matched belt replacements should be moved from groove to groove and the combination tested for difference in play. Pulleys should be replaced if uneven tension is observed.

It is of definite importance that multiple V-belt sets be of exact match. Thermoid explains that its belts are marked with nominal length variation symbols. For instance, a No. 50 belt is the nominal length. A belt marked No. 51 is 1 in. over nominal and so on. A belt marked No. 49 is 1 in. under nominal.

Check list for gas meter selection

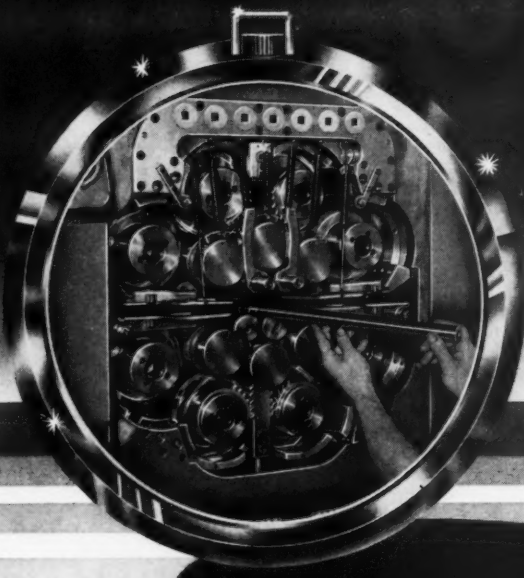
WITH the variety of industrial gases in use in the West today and the growing need for metering as a means of gas inventory control, the question often arises as to the type of meter needed for a particular application. Here's a rough check list provided by engineers of Rockwell Manufacturing Co.'s Industrial Meter Div. to aid plant operating personnel in making proper meter selection:

1. Practically all *inert gases* (neon, helium, argon, etc.) can be handled with a meter of standard construction. However, a meter capacity will vary due to difference in gas density; the lighter the gas, the greater the meter capacity required.

2. Since *combustible gases* are generally lighter than air, it is particularly important that a leak-proof meter construction be specified for this application.

3. Meters for *oxygen* applications must be specially constructed to prevent oil, grease, or dirt contact with oxygen vapor. The gas-grease combination can form a dangerously explosive mixture.

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Extra Close Tolerance Strip
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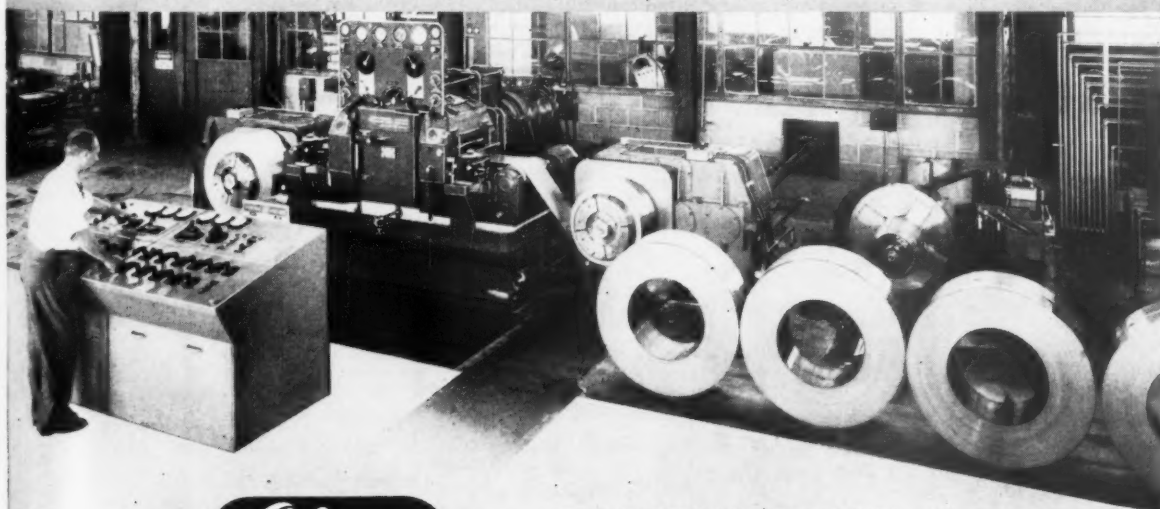
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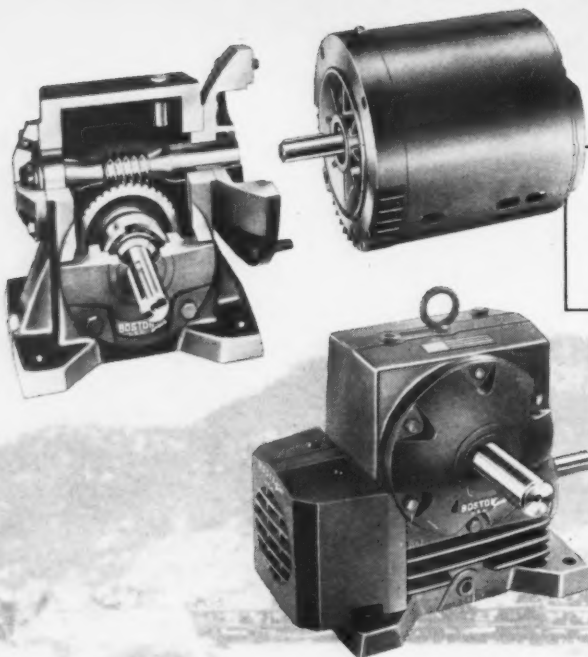
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TYPE OF MACHINE				TOOL NO.		PLANT	
MAKE				SIZE		SECTION	
CONTRACT NO.		CONTRACT DATE		ORDERED BY		COLUMN	
PURCHASED FROM				PURCH. ORDER NO.		E. ORDER NO.	
DATE INSTALLED		WEIGHT		FLOOR SPACE		COST OF MACHINE \$	
MAIN MOTOR	FRAME	H.P.	R.P.M.	VOLTS	PHASE	CYCLE	FREIGHT COST \$
AUX. MOTOR	FRAME	H.P.	R.P.M.	VOLTS	PHASE	CYCLE	COST OF ATTACHMENTS \$
CONTROL TYPE	MAIN MOTOR			AUXILIARY MOTOR			COST OF INSTALLATION \$
EQUIPPED WITH	COOLANT	CHIP PAN	DUST ARRESTER	MACHINE SERIAL NO.			TOTAL COST \$
SPECIAL ATTACHMENTS							

Records maintained on this machine tool data card are part of a scientific approach to . . .

Equipment replacement

Here's a system—and how it was devised—that insures economical equipment replacement at Westinghouse's Sunnyvale, Calif. plant.

MANY Western plants are recognizing the need for a scientific approach to equipment replacement decisions and the fact that such an approach can sharply reduce long range operating costs. Many have accepted and are using some form of engineering economy analysis of this problem. However, regardless of the method used, the accuracy of the results of such a study can be no greater than the accuracy of the information used in the study.

This fact is often not given enough attention. Instead, an individual's

judgment and memory are relied upon for facts that are used in calculations to arrive at close decisions.

The importance placed on the results of these studies should indicate the extent of effort made, or expense accepted, to insure accurate data. With this in mind, a study was made at Westinghouse's Sunnyvale, Calif., plant to determine: (1) what facts are necessary for a complete engineering economic replacement study; (2) how and where these facts can best be recorded; (3) what are the best sources for this data; and (4)

what is the added cost for this information.

Here are the Westinghouse answers to those questions and the details of the system installed as a result of this research.

What facts are needed?

Regardless of the form used for analysis, the data necessary for any of the generally accepted engineering economy approaches are basically the same. The problem is that of comparing the cost of operation of an existing asset with the estimated cost of operation of one or more possible alternatives, any of which will accomplish acceptably the required work. This cost is made up of two parts: (1) cost due to the decrease in capital value over the period considered, and (2) annual operating expense.

To arrive at a decrease in capital cost for the existing asset, it is necessary to establish two figures. First, the current capital value—defined as the amount that could be realized from the best possible disposition of the item—is needed. Second, a similar

AUTHOR OF THIS ARTICLE



. . . Burton L. Olmsted, plant engineer at Westinghouse Electric Corp., Sunnyvale, Calif., at the time he wrote this article, is now a member of Guering & Olmsted, Los Gatos, Calif., general contractors.

value at the end of its most economical remaining life.

In certain cases, the expense of disposal may offset any income realized from salvage, so the resulting net worth is zero. Usually, the rate at which the market value of an old asset depreciates is nominal, so the increase in annual disbursements becomes the deciding factor in establishing its economic life. When this is the case, the next year will provide the lowest total annual cost of operation for a given installation.

An exception to this is a case where, by a complete overhaul of a machine

tool, normal cost of maintenance is substantially minimized or operational labor cost is decreased by improved performance for enough years to more than justify the expense of the overhaul. This might extend the life to be considered.

It is most desirable to establish these capital values from current market quotations. When not available the value must be estimated. Information required for valuation of a facility is as follows: (1) Date when the equipment was first purchased. (2) Capitalized value when installed or erected (original cost plus transporta-

tion costs). (3) Cost of foundation required. (4) Cost of installation or erection. (5) Alterations or additions to asset. (6) Expected total life or expected remaining life.

To predict accurately the future annual disbursements necessary to continue a facility in service, it is necessary to know its past maintenance record and costs. Much can be gained from information on like assets, but types of applications may vary.

Data needed for prediction

The following lists the data that can make up these disbursements. (It is necessary to select only those items applicable to each specific case under consideration, since some facilities may not require all these services.)

(1) Annual maintenance costs. This includes labor, material, and cost due to any loss of productive time—such as is required for preventive maintenance, general repairs, or periodic overhauls. (2) Main fuel consumption cost. (3) Cost of additional facilities: air, water, gas, electricity, etc. (4) Tooling costs (cutting tools, jigs, fixtures, and dies.) (5) Cost of miscellaneous operating supplies (lubricating oil, coolant oil, rags, or other materials). (6) Direct labor costs. (7) Indirect labor costs. (8) Cost of spoilage. (9) Cost due to space requirements. (10) Cost of insurance and taxes.

Cost information on a new asset must, of necessity, be derived from the vendors' quotations and engineering data of manufacturers. However, there is a definite advantage in having past records by which to qualify the validity of vendors' data and to temper their claims.

The importance of determining the most economical alternative capable of fulfilling all requirements cannot be over-stressed. It must be recognized that the most economical investment is not necessarily that with the lowest first cost.

Articles describing new equipment and its application are valuable aids toward selecting alternatives for consideration. As subjects are found that may have application in the plant, the articles are indexed so further references can be made to them when and if the need arises.

Where and how to keep data

Under the Westinghouse organization, the final responsibility for selection, purchase, installation, and maintenance of all capital assets rests with the plant service department. This includes the function of plant engineer-



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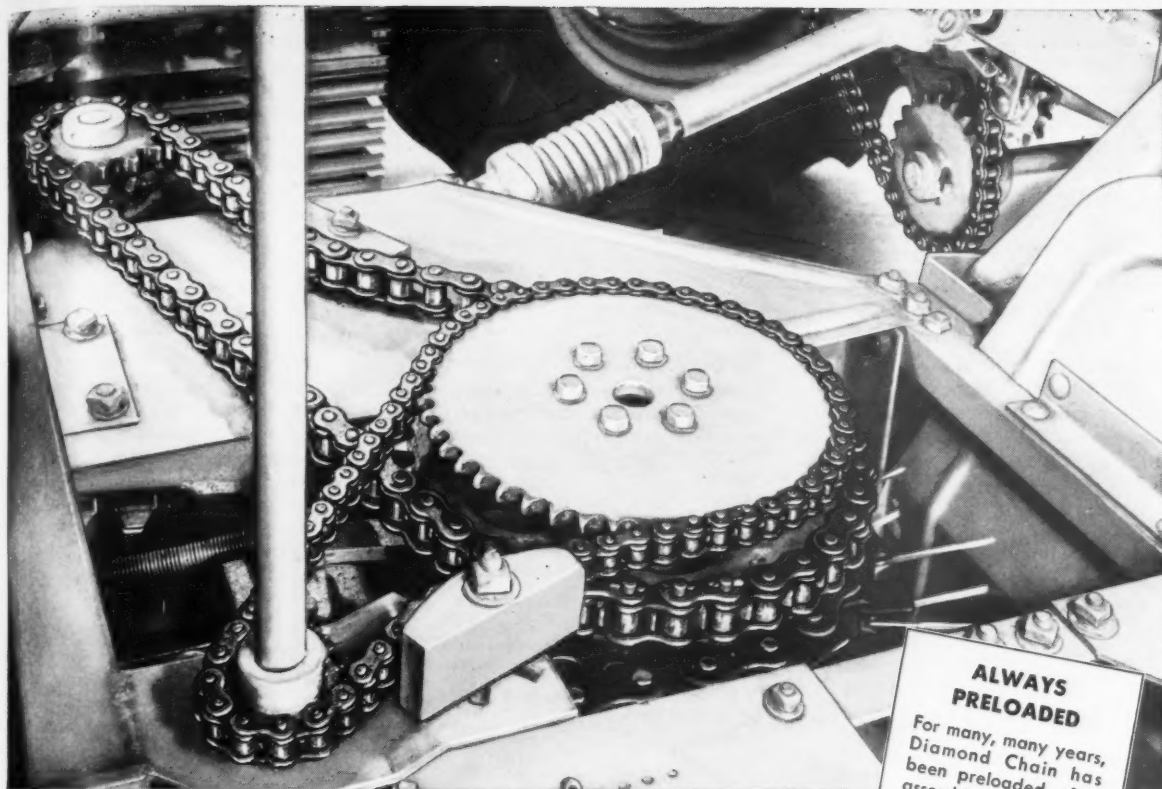
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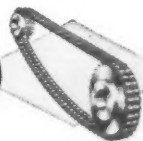
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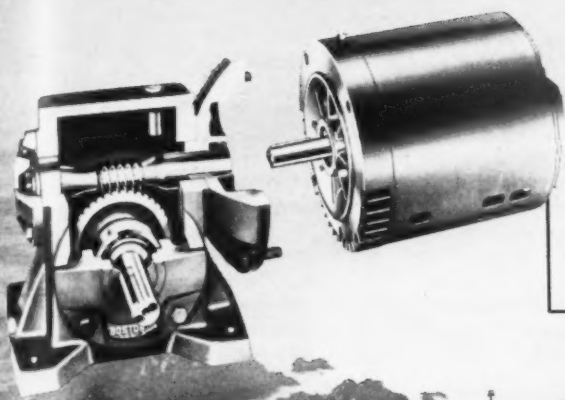
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given company is from an actuarial study made of its own assets. It is important enough to have statistics that are based on local conditions and reflect company policies to warrant the extra effort and expense.

Dates of acquisition and retirement for units already installed may not be available. Once such an age record is established for each group of units that can be expected to have a similar life, it then becomes a small task to keep the data current. Survival curves can be made as required.

Hard to obtain annual costs

Collection of information on annual expenses is the greatest problem. The most logical source for the maintenance labor costs is from the time reports of the maintenance crew.

Maintenance materials can be divided into three categories—those purchased specifically for the job, those drawn from plant storerooms, and the miscellaneous small value items for which there is no item accounting. By routing copies of all purchase orders and storeroom requisitions across one desk, the required information is gathered.

Collection of data on the miscellaneous operating supplies is handled

similarly. Expense of the materials of small individual value is prorated by means of a costing rate per labor hour. A record is made of a unit's fuel consumption and other utility demands on a machine tool data card. This information is obtained from the engineering data furnished by the equipment manufacturer. Periodic checks are made to detect changes.

A tool control system set up to standardize and coordinate the purchase and issue of all cutting tools, jigs, fixtures, and dies already existed. The only change necessary in this system was that of identifying orders to a specific machine. Tool costs are accrued from these orders.

Direct and indirect labor costs are estimated at the time of each study from operation time studies and from production cost records. There is no continuous record of spoilage. However, as soon as a machine is considered for a replacement study, this spoilage is recorded by the manufacturing engineers. Costs can then be calculated from production cost data for the individual operation involved.

The value assigned to floor space by the accounting department is used to calculate the costs of operating space required by a specific asset, and the figure adjusted according to space

demand on that area. Annual insurance and tax costs are available from the accounting records and are based on the book value of the asset.

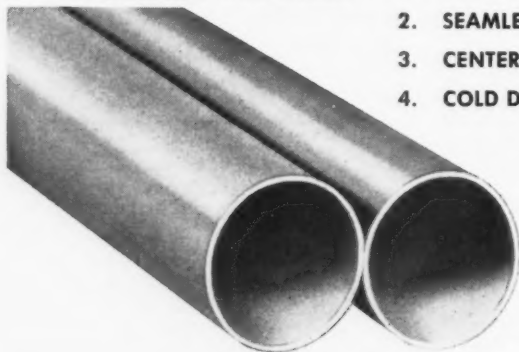
Cost of maintaining history

It is difficult to separate the costs of recording data required for economy studies from the cost of keeping the data required for the maintenance of assets. Much of these data are common to both purposes, and the records are integrated. Where the previous system has been changed to accommodate the need for replacement studies, improvements have been noted in the maintenance program. The operation of receiving work requests and dispatching work orders requires the full time of one person.

Although it was necessary to add one employee to the office force for this specific duty, time previously required of the foreman and group leaders for this purpose is now available for other application. Approximately 2 hr. a day are required to collect and post the cost information on the more than 2,000 capital assets in the plant. One hour a day is spent maintaining the files. These two duties were easily absorbed by the routine of the office without the addition of personnel.

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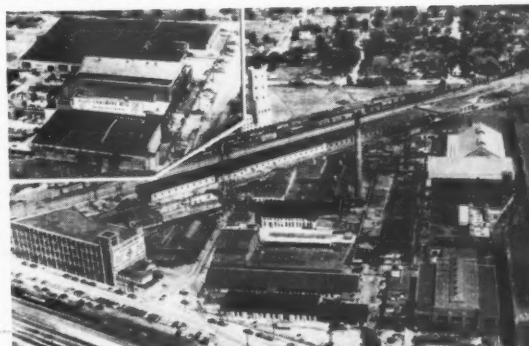
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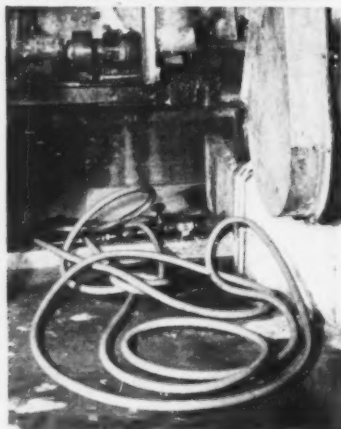
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A single 1x3-in. Nelson threadless stud is quickly end-welded to each forging billet providing a clean, firm tong hold for forge hammer handling of the billet. Billets were formerly rolled to provide tong holds—a method that required extra steel and time.

Fire! Aid Arrives on plant scooter

IF A FIRE breaks out at the Maywood, Calif., plant of United States Steel's Consolidated Western Steel Division, plant protection firemen can scoot to the scene and start battling the blaze, all in 3 min.

The steel firm's miniature fire truck, a converted electric Autoette scooter, can transport a crew of four to any point of the 37-acre plant in 90 sec. In another 90 sec. the crew can couple the hose to a hydrant and play a stream of water on the fire.

Conceived and designed as a piece of fire fighting equipment by E. K. Hunt, chief of plant protection, the three-wheeled scooter is equipped with 400 ft. of hose, a 2 1/2-gal. water pump tank, a 30-lb. dry chemical extinguisher, and a 1-gal. carbon tetrachloride extinguisher. It also has an all-purpose gas mask, 100 ft. of 5/8-in. manilla rope, a fireman's ax, and a first aid kit.

The crew ride like firemen with the driver and one man in front, and two others on the tail step. When answer-

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PACIFIC COAST ENGINEERING, Alameda, California, calls itself "Tailors of Steel" in describing its service to a wide range of industries. Specialized steel fabrication is their business, like the huge 100-ton crane at right made with steel plate, sheet and structurals.



AMERICAN BRAKE SHOE, Ramapo Ajax Division, Los Angeles, makes a wide variety of railroad track equipment using Kaiser Steel plate. The "equilateral turnout" shown to the left allows high speed passenger trains to pass slower freights with maximum safety.

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3-WHEEL FIRE ENGINE delivers its four-man crew to any location in an 87-acre plant in 3 min. or less at a top speed of 12 mph.

ing an alarm, the fire engine red scooter, which has a top speed of 12 mph., is driven to the hydrant nearest the blaze where one of the men riding the tail step jumps off and couples the hose to the hydrant. The

scooter continues on its way, laying out line until it reaches the fire, where crewmen attack the blaze to quench it or if the fire is serious, to contain it until equipment from the Los Angeles County Fire Department arrives.

Power plant oil stays cleaner longer

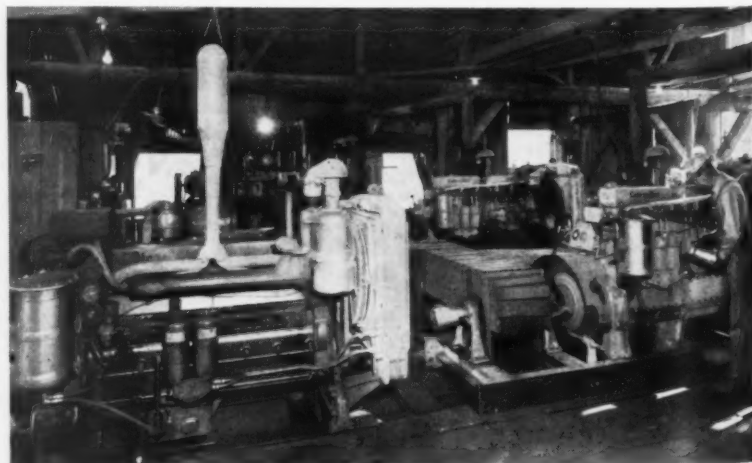
SMART plant operating and a manufacturer's eagerness to test its product have resulted in a reduction in periodic lubrications—from every 140 operating hours to every 1,000—of a power plant at Byles-Jamison Lumber Co.'s Fresno, Calif., mill.

When the mill determined its power plant requirements it hit on one important factor—flexibility. The unit consisted of four 13,000 Series Caterpillar engines connected to a main generator shaft. Each engine transmits its power by means of nine V-belts. Later a Series 17,000 Caterpillar V8 engine was added to this drive system, thus providing an extremely variable power plant capable of delivering a total of 610 hp.

Carriage and kickers in the plant are

steam operated, but the rest of the in-plant power is obtained from electric motors.

When the mill started using Texaco crankcase oil, it was decided, because the plant was carefully maintained and the operating conditions were favorable, drain periods would be extended in order to determine the maximum time the oil would last and still give 100% protection. Drain periods were first extended to 400 hr., at which time the filter was changed also. The Texas Co. and Twining Laboratories of Fresno, Calif., both conducted tests on the oil and found it to be in good condition so drain periods were again extended. The oil is now being run 1,000 hr. between changes with filter changes every 500 hr.



A CHANGE IN OILS resulted in extension of lube frequency by 860 hours on this 610-hp. power plant at Byles-Jamison Lumber Co.'s mill.

BOOKS

Work Sampling

"Work Sampling," a 265-page book recently published, explains how sampling may be used for measuring work as well as delays of men and machines. Basic concepts of work sampling are presented in readable form and illustrated with cases and specific applications.

Reports on research in the field of work sampling are included in the book, along with results of research done by Ralph M. Barnes, author of the book and professor of engineering and production management at the University of California.

Opening with a history of work sampling and fundamental statistical concepts pertaining to it, the book gives practical suggestions for determining sample size, explains use of random number tables and procedures for making a work sampling study. William C. Brown Co., 215 W. Ninth St., Dubuque, Iowa. (\$5.75)

Air conditioning

Newly-revised edition of "Trane Air Conditioning Manual" is a 380-page work with new material added to chapters on heat and comfort. Examples have been revised in the sections on heating and cooling with air, moisture calculations, latent heat calculations, dry bulb temperature and humidity, by-passed return air, and the capacity of refrigeration plants. New data is also supplied on refrigerants and refrigerating effect, quantity and condition of air supply, size of the refrigeration plant, compressors and compressor capacity. Educational Division, Trane Co., LaCrosse, Wis. (\$6.50)

Steam contamination

In this bibliography are 1,085 references to information on contaminants in steam and how to determine them. Mechanical and chemical factors contributing to steam contamination embrace equipment design, operating conditions, pretreatment of boiler feed-water, antifoam treatment, control of mineral content of boiler water, and volatile inhibitors for preventing condensate system corrosion.

The references, arranged alphabetically by name of the authors, include a short annotation or abstract of the work in cases when the work was available for such review. A classified index groups the subjects into seven main headings. American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y. (\$2.50)

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45 BEST MANUALS ON DRIVE BELTS

—yours for the asking

Here are today's best manuals covering all types of drive belts—V, flat and specialty. Obtain your selection by circling item numbers on postcard, page 67.

LISTED BELOW are concise reviews of 45 of the best manufacturer manuals available today covering all types of belting for mechanical power transmission—V-belts, flat belts, chain drives, the relatively new timing belts.

Packing in their pages a tremendous fund of the latest know-how needed by specifiers and buyers of

drive belting, the manuals were collected over the past three months by the editors of **WESTERN INDUSTRY** as a special service to readers. By special permission of the manufacturers, the manuals are made available here free of charge to key production and plant operating men in Western manufacturing and processing plants.

You are invited to check the listings on pages 60 through 65 quickly and select those manuals that promise to be most helpful with your belt drive problems. Circle appropriate numbers on this month's **WESTERN INDUSTRY** Reader Service Postcard (on page 67) and we will be glad to see that you obtain your complete selection promptly.

180-page handbook on V-belt drive selection

This V-belt drive design and selection handbook is divided into seven sections, opening with the development and application of V-belt drives. The second section on V-belt drives for standard motor speeds includes speed reduction drive selection tables for standard motor speeds using standard V-belts and sheaves; the third section on supplementary drives has speed-up drive selection tables for standard motor speeds. Other sections cover V-flat drives using existing flat pulleys, designing V-belt drives, special design information, and installation and maintenance of belts. (Handbook 280-B) *Dayton Rubber Co.*

... for your copy, circle No. 150

305 pages on light duty V-belt drives

These two books give complete information on light duty V-belt drives. The first book, with 90 pages, contains design and selection data with over 60 pages devoted to charts. Included in the discussion are typical installations and V-belt design, multiple V-belts for replacement, V-to-flat drives, quarter-turn drives, double V-belts, special V-belt constructions, and light duty V-belt standard drives and belts for replacement. The second book of 215 pages is a replacement guide, giving makes, models, manufacturers' part numbers, and belt numbers. *United States Rubber Co.*

... for your copy, circle No. 151

76-page multi V-belt engineering handbook

This 76-page multi V-belt engineering handbook is divided into eight indexed sections, including multi V-drives, V-V design, belt sizes, stock drives, horsepower ratings, special V-V drives, V-flat drives and $\frac{1}{4}$ -turn drives. Twenty-two tables are included, giving information on installation and take-up allowance, V-belt selection, multi V-belt dimensions, belt speeds, horsepower ratings, length correction factor, stock sheaves sizes, and many other factors. Well illustrated with pictures and drawings giving how-to information. *Goodall Rubber Co.*

... for your copy, circle No. 152

80-page timing belt drive manual

Divided into 13 sections, this manual covers construction of the timing belt, basic engineering data on standard timing belt drives, considerations in selecting a stock drive, hub, and bushing dimensions, and installation data. Tables cover selection of stock drive, application-service factors, drive selection for light and heavy duty, and standard stock pulleys. Length and width charts and a section on non-stock standard drives completes the manual. *R. & J. Dick Co., Inc.*

... for your copy, circle No. 153

190-page engineering handbook on timing belts

Opening with a discussion of the origin of the timing belt and the characteristics of the timing belt drive, this 190-page hard-cover engineering handbook is divided into six sections: basic design and construction of the timing belt with explanations of nomenclature and standard timing belts; timing belt pulleys, design, methods of manufacture, pulley cutters, pulley application, and standard stock pulleys; timing belt length calculations for standard and non-standard drives; belt width calculations; and finally applications for timing belts in fields such as automotive, aviation, business machines, chemical, electronics, machine tool, and textile machinery. The appendix is composed of tables and additional information. The book was written by Richard Y. Case, engineer and inventor of the timing belt and edited and produced by the technical writing service of McGraw-Hill Book Co. *New York Belting & Packing Co.*

... for your copy, circle No. 154

Illustrated booklet on Poly-V drive

This eight-page booklet opens with a list of the special characteristics of the Poly-V drive and shows generator and compressor applications. Construction features are shown in many large illustrations and belts are compared to standard V-belts. *Raybestos-Manhattan, Inc.*

... for your copy, circle No. 155

32-page handbook on splicing rubber belts

How to splice rubber transmission belts with the Plylock belt joint is explained in this 32-page illustrated handbook. The book tells how to make the splice, lists tools and materials required, and tells how to assemble the splice on the drive. A section on splicing instructions describes and illustrates the procedure for stepping down belt ends, cementing and applying tie-gum, assembling fill-in material, and vulcanizing the splice. Special instructions are given for splicing folded edge belts, spindle belts, and belts which operate on limited or no-take-up drives. Tables for figuring endless belt lengths and the time required to vulcanize belting of various thicknesses and types are included. *B. F. Goodrich Co.*

... for your copy, circle No. 156

Data on adjustable V-belt for heavy-duty use

Manheim's Velcos TD and TE adjustable V-belt for D and E drives is detailed in this eight-page booklet which lists the features of the belt along with instructions for coupling and uncoupling, installing, and measuring. Tables give horsepower ratings, arc of contact correction factors, and drive ratings. Dimensions, prices, and weights are included. Applications are illustrated. *Manheim Manufacturing & Belting Co.*

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Two brochures on multi, light-duty V-belts

The first of these two four-page brochures contains descriptions of the Powerflex Hi-Capacity V-belt and open-end V-belt along with construction features and dimensions of the available belts. (No. 3787-R) The second leaflet gives construction features of light-duty V-belts and includes a special table of belt numbers. Outside circumference and top width of belts is included along with belt conversion tables based on a system of standard identification. (No. 3788) *Thermoid Co.* ... for your copy, circle No. 158

100-page multi V-drive engineering manual

This master engineering manual on multi V-drives has complete information on Worthington's drives and stock size sheaves. Indexed for easy reference, the manual is divided into sections which include information on selection of stock drives, belt speed and stock ratios, horsepower ratings, special applications, installation, and maintenance. Well illustrated with drawings and photographs, the book has many pertinent charts. (Book V-1400-E2FP) *Worthington Corp.* ... for your copy, circle No. 159

72 pages on multiple V-belt drives

This rope drive design catalog devotes one section to V-V drives—their selection, answers to V-V drive problems, selection tables and V-V drive design; and a second section to V-flat drives—when to use them, how to select them, selection tables, and design information. Other information given includes horsepower rating, installation and care of rope drives, how to design ¼- and ½-turn drives, uses for idler pulleys, and multiple groove sheave information. (Catalog DH-300) *Gates Rubber Co.* ... for your copy, circle No. 160

Engineering guide to multiple V-belt drives

This 48-page booklet includes descriptions of many V-belt types, instructions for selecting multiple V-belt drives by using the tables given, horsepower service factors, procedure for complete design of multiple V-belt drives, sheave sizes, standard V-belt pitch lengths, length correction factors, and other additional information. Fifteen pages of the indexed book contain tables. (Section 50-B) *Fort Worth Steel & Machinery Co.* ... for your copy, circle No. 161

Purchasing guide for textile belting

This guide to the purchase of textile belting gives information on nine different kinds and illustrates seven of them in color. Additional booklets give more detailed information on an all-purpose belting for industrial use, white cotton belting, and a heavy-duty textile belting. Each is illustrated with pictures of the belting and application pictures; each discusses construction and gives technical information. *Victor Balata & Textile Belting Co.* ... for your copy, circle No. 162

Introduction to five types of flat belting

Five types of transmission belting, including square and folded edge and endless, are detailed in this eight-page leaflet: high speed R for high speed severe service over small pulleys, high speed N for use with oil and grease, No. 400 for continuous service in general industry, No. 432 for light industrial applications, and No. 428 for stationary installations. Width and ply information is included for each type, along with a horsepower capacity chart. Booklet also has technical data, tables, and working formulas. (No. 3678) *Thermoid Co.* ... for your copy, circle No. 163

Catalog on complete link V-belt line

This 24-page picture and chart book details Manheim's line of Veclos link V-belts, describing types and sizes, and giving engineering information concerning installation. A great many pictures show drive applications for machine tools, line shafts, pumps, compressors, and generators. A diagram illustrates the belt's construction and a picture-chart for measuring width is included. *Manheim Manufacturing & Belting Co.* ... for your copy, circle No. 164

Fact sheet on Neoprene rubber belting

This six-page fact sheet on Neoprene rubber belting in black, white, or brown for conveying, elevating, and power transmission gives information on eight different kinds of belting. Each is pictured and discussed, and the group includes heavy-cover rubber belting, Neoprene ruff top, Kling top, and cleated belting for elevating packaged, bulk, or granular materials. Width-price charts are included as well as specifications. *Globe Woven Belting Co., Inc.* ... for your copy, circle No. 165

Three booklets on flat transmission belts

An eight-page engineering guide for flat transmission belts and belting includes a check list of information required to design a drive or select replacement belting, typical drive arrangements, belt calculation, replacement problems and the problems of new design. (Catalog 142) A second booklet on flat transmission belting discusses materials and belts for heavy-duty, medium-duty, light-duty, and conveyor service. (Catalog 145) The third book, on flat endless transmission belts for industrial uses, treats construction and specific belts for general, high-speed, light-duty, and special applications. (Catalog 150) *United States Rubber Co.*

... for your copy, circle No. 166

Manual on care and maintenance of V-belts

This 14-page illustrated manual on the care and maintenance of industrial V-belts gives information on cleaning and storing and lists some of the typical causes of belt failure along with hints for prevention. Also included are designing the new drive, double matching, installation of belts, information on V-belt gripping, importance of tension, drive alignment. Pictures show many applications of belts and some of the damage that can be done to them. *B. F. Goodrich Co.*

... for your copy, circle No. 167

Leaflet on Ton-Tex transmission belting

A four-page leaflet on belting for power transmission drives and conveyor installations discusses belt construction and applications, also listing advantages. A comparison chart and horsepower table are included. Brief information is given for heavy duty belts; the Oil-Ex, an oil-proof belt; lapless endless belt for precision work; a segment type of V-belt; Pure-O-Tex, a white non-toxic conveyor belt; and clawtop belt for conveying packages. *Ton-Tex Corp.*

... for your copy, circle No. 168

44-page booklet with quick selection tables

Eighteen pages of this 44-page booklet on variable speed Texrope drives are devoted to quick selection tables with complete instructions on using them. Booklet also includes information on design features, drive principles, horsepower rating tables, a speed range table showing the variation in rpm. when using two Vari-Pitch sheaves in combination, and accessory equipment for the Vari-Pitch drive. (Booklet 20P50) *Allis-Chalmers Manufacturing Co.*

... for your copy, circle No. 169

Data on 8 stitched canvas belts

This four-page booklet opens with detailed information on construction of these heavy-duty hard silver duck belts—discussing tensile strength, wearing qualities and the inner-locking stitched construction. Eight different belts are detailed briefly, including those for power transmission, general conveying and elevating, oil, acid, and moisture resisting, for high speed conveyors, small diameter pulleys, and live rollers. Illustrated. *Imperial Belting Co.*

... for your copy, circle No. 170

Data book on power transmission equipment

Browning's line of power transmission equipment is covered in this 20-page booklet, which has sections on V-drives, Poly-V drives, sheaves, couplings, pulleys, keys and roller chain drives. Each section is illustrated with photographs and drawings and has pertinent chart information. (Booklet GC-101-C) *Browning Manufacturing Co.*

... for your copy, circle No. 171

Inside story of sealed-life V-belts

A six-page three-color brochure pictures and explains the normal-duty and special-duty Dodge sealed-life V-belts, also illustrating applications. Six charts give information on weight, length, number, and price of the belts. (Bulletin A-606A) *Dodge Manufacturing Corp.*

... for your copy, circle No. 172

Data on fractional horsepower V-belt drives

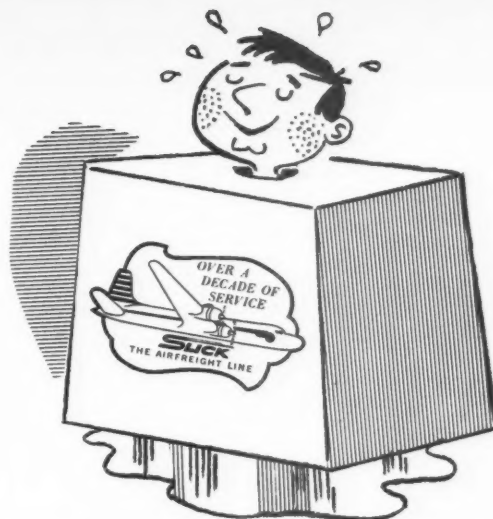
A 24-page chart book on fractional horsepower V-belt drives includes information on V-belts, pulleys, interchangeable bushings, fans, and concludes with engineering drive data. All information is given in detailed chart form. A drawing illustrates special characteristics of the fractional horsepower V-belt. (Catalog 150A) *Dayton Rubber Co.*

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Data sheet on grommet V-belts

This eight-page data sheet on grommet V-belts gives complete instructions on how to figure a V-belt drive with procedures listed and examples given for each step. Features of multi V-belts are discussed and illustrated, and the sheet includes 10 tables on V-belt selection, sheaves size, service factors, small diameter factors, horsepower ratings, correction factors, and V-belt numbers, sizes, and pitch lengths. *Goodall Rubber Co.*

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80-page timing belt standard drive manual

Divided into 13 sections, this timing belt manual covers construction of the belt, engineering data, steps in selecting a stock drive, horsepower ratings, instructions on how to use the stock drive, selection tables, and tables of application-service factors. Drive selection tables and standard stock pulley tables are also included. Hub and bushing dimensions and installation data are given and a final section is devoted to engineering special drives. (Booklet NY-223) New York Belting & Packing Co.

... for your copy, circle No. 175

Folders on hooks, belt lacing equipment

Special purpose belt hooks in Monel, stainless steel, and bronze are pictured in this folder, which also gives information on best uses for each hook and a size and price table. Details on connecting pins are included. (Leaflet 84-A) A second leaflet on belt lacing equipment covers several lacers, connecting pins, and gives more information on hooks. (Leaflet 90) Clipper Belt Lacer Co.

... for your copy, circle No. 176

Engineering data on industrial V-belts

A 60-page handbook on drive selections and engineering data for multiple and general duty industrial V-belts opens with a discussion of construction and includes data on engineering a standard V-V drive, designing a V-to-V drive by calculation, allowing for installation and take-up, and use of idler pulleys. Many pages of charts are included. (Booklet D-161C) Durkee-Atwood Co.

... for your copy, circle No. 177

30-page handbook on variable speed pulleys

Variable speed motor pulley drives are covered in this booklet, which shows the five different sizes of belts available, ranging from 3/8 to 2 3/4 in., and the various pitch lengths available for each size. The V-to-V operating principle is explained, as is installation. Drive selection data is given along with general dimensions in chart and diagram form. (Catalog 655) Gerbing Manufacturing Corp.

... for your copy, circle No. 178

Data on Alligator V-belt drive units

Two single page leaflets cover Alligator open-end V-belt, fasteners, and tools for A, B, C, and D drives. Information on belt and pitch length is given along with replacement charts for A, B, C, and D section endless V-belt. Application of Alligator V-belt fasteners is illustrated in eight pictures, each captioned with instructions. (Bulletin V-215A) Flexible Steel Lacing Co.

... for your copy, circle No. 179

Brief data on open-end V-belt

An illustrated sheet covers V-belt supplied on long lengths for use with fasteners. It gives dimensions of A, B, C, and D-section belting, recommends sheave diameters, and gives rules for application. Fasteners and application tools are covered briefly. (Section 30) Fort Worth Steel & Machinery Co.

... for your copy, circle No. 180

Leaflet on link V-belt for replacement

A four-page leaflet discusses and illustrates link V-belt for emergency replacement and for use where special size belts are required. Instructions and recommendations for assembly and installation are given, along with horsepower ratings and size selection charts. (Section 25) Fort Worth Steel & Machinery Co.

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Guide for selecting V-belt drives

Information on standard, high capacity, fractional and wide range V-belts is contained in this 12-page booklet, "A Handy Guide for Selecting Texrope V-Belt Drives." Tables of belt sizes and a discussion of types of construction are included. (Booklet 20C6051R) *Allis-Chalmers Manufacturing Co.*

... for your copy, circle No. 182

Why use V-belts on variable speed drives?

This question is answered in a 12-page booklet on variable speed belts, which explains and pictures the three sections which make up the Dayton cogbelt. Advantages of variable speed drives are pointed out and 8 pages of pertinent charts are included. (Catalog VS10) *Dayton Rubber Co.*

... for your copy, circle No. 183

Complete data on Dick flat belting

Two leaflets of four pages each cover flat belting for transmission, conveying, and elevating. Construction features of Balata belt and Dixitbelt are given, along with price lists, horsepower ratings, and charts showing the minimum diameter pulley which should be used for horsepower at different speeds. *R. & J. Dick Co., Inc.*

... for your copy, circle No. 184

Picture pamphlet on woven endless belts

Color pictures of five types of woven endless belts for power transmission make up this four-page pamphlet. Pictured and discussed are the cotton, nylon, hand woven, round braided, and Hevaloid endless belts. An applicatin picture shows the belt used on an internal grinder. *Globe Woven Belting Co., Inc.*

... for your copy, circle No. 185

Leaflet on segment type V-beltting

This six-page leaflet opens with a list of the advantages of Ve-Ezy segment-type V-belts and includes a complete section with pictures on their installation. Application pictures are shown also and complete engineering data given, including six tables. *Ton-Tex Corp.*

... for your copy, circle No. 186

Two leaflets on Raybestos V-belts

A four-page leaflet on Condor V-belts illustrates their construction with drawings and explains it with accompanying text. A size and price chart is included. The second booklet treats the Super-Power V-belt, also giving construction characteristics and listing advantages. Prices and sizes are included. *Raybestos-Manhattan, Inc.*

... for your copy, circle No. 187

Booklet on quick detachable V-belt

How to connect and disconnect Vee Ply quick detachable V-belt is illustrated and described in this 12-page booklet. Installation is also pictured and instructions given for measuring the belting. Construction features of the belting are explained and charts on horsepower ratings, drive selection, and arc contact correction factors are given. (Booklet V-1400-B18A) *Worthington Corp.*

... for your copy, circle No. 188

Background data on whipcord endless belt

Construction and advantages of this whipcord belt with endless cord construction are outlined in a four-page brochure, which also explains two types of surfaces available—Hycoc surface for more grip and Bareback pulley surface for less grip. Instructions for taking the proper belt length are given along with a horsepower rating chart. *Raybestos-Manhattan, Inc.*

... for your copy, circle No. 189

Price and size leaflet on V-belts

Comparison charts for prices and sizes of multiple and fractional horsepower V-belts and non-endless V-beltting are included in this 12-page leaflet which also has a special section on construction features and advantages of the non-endless belting. Descriptions and pictures of the tools necessary for installation are given as well as installation data. *R. & J. Dick Co., Inc.*

... for your copy, circle No. 190

Watch for reviews of the latest and most helpful manuals available on WELDING in the August WI.



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HELPFUL LITERATURE

for the West's plant
operating executives

FOR YOUR FREE COPIES, circle appropriate key numbers on postcard, page 67

60-page manual on stock sprockets

This 60-page manual on stock cut-tooth sprockets contains pictures and specifications for standard roller chain and stock sprockets for single, double, and triple width chain. Sprocket numbering is explained, complete instructions for ordering are given and installation is detailed. Book also has information on taper-lock sprocket installation and bushing dimensions, bore sizes, and keyway dimensions for taper-lock bushings, and keyway, setscrew dimensions, and bore tolerances. (Bulletin 2201) *Chain Belt Co.*

... for your copy, circle No. 200

Book of case studies in methods of lifting

"Case Studies in Modern Lifting" is a 50-page collection of studies of Oilift installations in manufacturing plants, warehouses, storage depots, laboratories, etc. Pictures and drawings illustrate the applications; each is thoroughly described in the accompanying text. Two survey forms are included at the end of the booklet along with data on ordering the industrial lifts. Also included is a four-page pamphlet on the Globe Trans-O-Matic ramp with special features pointed out in a large photograph. *Globe Pacific Hoist Co.*

... for your copy, circle No. 201

List of available bar stock, special shapes

A four-page brochure on Meehanite metal bar stock and special shapes pictures and gives information about right angle irons, angle plates, solid round bars, round plates, and rectangular, square, and cored round bars. Dimensions for each type are given. *Compton Foundry*

... for your copy, circle No. 202

Four books on electric load handling equipment

A condensed catalog of Shaw-Box's load handling equipment details the Budgit hoists with capacities from 240 to 4,000 lb.; the Tugit, a lever-operated portable tool for lifting and pulling; and the LoadLifter electric hoists and cranes. Pictures, diagrams, specifications, and charts are given for each. (Bulletin 406) The portable electric Budgit hoists are detailed more thoroughly in a 12-page booklet which has many application pictures. (Bulletin 391-F) Two similar booklets are devoted to the Series 600 and 700 LoadLifter electric hoists with a cut-away drawing showing construction features. (Bulletins 408, 410) *Shaw-Box Crane & Hoist Division, Manning, Maxwell & Moore, Inc.*

... for your copy, circle No. 203

Specification sheet on heavy materials pump

The Ram-Pak Pumper designed for more effective application of adhesives, mastics, caulking compounds, and other heavy hard-to-pump materials is completely specified in this two-page bulletin. A portable unit, it has a variable base designed to receive most sizes of drums and is air powered to handle heavy fibre loaded sealers. *Dozier Manufacturing Co.*

... for your copy, circle No. 204

Selection guide for electric trucks

Ford trucks, platform and pallet trucks, and tractors, cranes, and special trucks are all covered in this 16-page selection guide for electric industrial trucks. Characteristics for each are given in chart form, as well as complete specifications. Pictures and diagrams illustrate many different models. *Automatic Transportation Co.*

... for your copy, circle No. 205

30-page loose-leaf book on industrial cranes

This picture and chart book gives information on cranes and how to select and use them, along with crane specifications. Parts treated include box girders, I-beam girders, bridge trucks, drives and parts, trolleys and trolley frames, crane controls and clearances, and concludes with many pictures showing cranes in use. (Bulletin CR-610) A second four-page leaflet covers many types of crane controls. (Bulletin CE-400) *Ederer Engineering Co.*

... for your copy, circle No. 206

Leaflets detail Milwaukee's line of electric tools

Among the tools pictured and accompanied with specifications in these two leaflets are drills, drill accessories, drill press stands, screw-drivers, nut-runners, screw shooter accessories, electric hammers, grinders, sanders, polishers, and saw blades, and accessories. The Sawzall, a heavy-duty all-purpose portable electric hacksaw, and the heavy-duty, tri-speed right-angle drill are treated in more detail in a separate leaflet which shows pictures and gives prices. *Milwaukee Electric Tool Corp.*

... for your copy, circle No. 207

Technical pamphlet on expendable pallets

"What You Should Know About Expendable Pallets" is a guide to help those purchasing pallets understand the construction and use of wooden expendable pallets. Data on types of expendable pallets, construction standards for pallet parts and fastenings, and allowable tolerances are included, along with an application rule for the use of expendable pallets and a list of definitions and terms. *National Wood Pallet Manufacturers Assoc.*

... for your copy, circle No. 208

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July 1956

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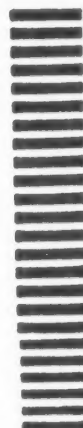
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A guide to understanding and purchasing rubber

"A Guide to Rubber" is a 12-page booklet which presents in chart form the advantages and disadvantages of nine basic types of rubber. Properties covered include hardness, tear resistance, abrasion resistance, sunlight and oxidation aging, shelf life, flex resistance, compression set, and resistance to oil, acid, flame, and cold. ASTM and MIL specification charts are included as well as charts for measuring rubber. The final page lists terms used for measuring rubber. A group of pictures shows some of the processes in rubber manufacture. *West American Rubber Co. of Los Angeles*

... for your copy circle No. 209

Folder on enlarged line of sanders, grinders

Max's enlarged line of disc sanders and grinders is covered in an eight-page folder which also shows the abrasive cut-off machine, abrasive belt grinder, and saw sharpeners. Fifteen machines, together with attachments and accessories, are described and illustrated. (Folder 56-1) *Max Manufacturing Co.*

... for your copy circle No. 210

36 pages on mobile safety electrification

Systems of mobile safety electrification for cranes, monorails, and all moving machinery are pictured and described in this 36-page booklet. Included is information on typical installations, complete engineering data, installation procedure, a photo-text list of items that comprise the systems, and additional pertinent data. *Insul-8-Corp.*

... for your copy circle No. 211

20 pages on insulations for industrial application

Insulations for the control of temperatures from 400 deg. to 3,000 deg. F. are the subject of this 20-page booklet, which provides information on the composition, physical and thermal properties, and sizes of thermal insulations and refractories. Included is information on blocks, sheets, ducts, tapes, blankets, and a section on insulations for heated piping, low temperature piping, and refrigeration piping. Insulating fire brick, patching and castable materials, aggregates, fills, and boiler coatings are also discussed. *Johns-Manville*

... for your copy circle No. 212



... the TWINS with the AMAZING PRICE TAGS!

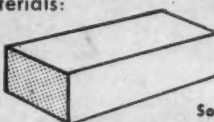
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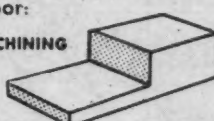
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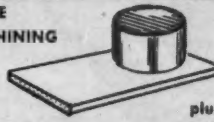
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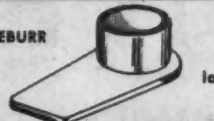
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Materials:  Solid Bar Stock

Labor:  **70% Metal Waste plus high labor**

LATHE MACHINING  Extra labor cost plus expensive equipment



DRILLING and REAMING  More labor cost



BLANK and DEBURR  Added labor cost

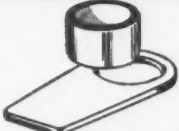
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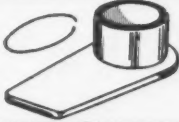
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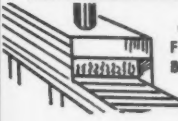
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Materials:  Tubing  Stamping

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DEBURRING  by low cost Machine Tumbling

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* Can Be Heat Treated After Brazing

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70

Basic selection guide for casters and wheels

How to select casters and wheels for industrial uses is explained in this 20-page booklet which also includes ordering instructions for each type. Casters in nine series are pictured and described; charts give complete specifications. Metal wheels, rubber-tired wheels, and wheels of molded plastic are also pictured and explained with accompanying charts. A few of Colson's custom-built industrial casters are shown. *Colson Corp.*

... for your copy circle No. 213

Data on gearmotors and adjustable speed drive

A four-page leaflet points out 10 features of Marathon gearmotors and displays a large cutaway photograph of a gearmotor to point out these construction features. Brief specifications are included. A second booklet with eight pages explains the Automator adjustable speed drive, which is particularly adaptable to automatic machine tool and production machinery. General design features are pictured. *Marathon Electric Manufacturing Co.*

... for your copy circle No. 214

New free publication for plant engineers

"Production and Plant Ideas" is a bimonthly publication for use by tool design and plant engineers. It contains short, informative, and illustrated idea articles on the design of air powered equipment for production operations. It also has articles for simplifying and saving time in plant maintenance work. To be placed on the mailing list for your copies, circle number below. *Keller Tool Div., Gardner-Denver Co.*

... for your copy circle No. 215

Specifications for two-speed, all-purpose industrial truck

This specification bulletin on Tow-Bear's industrial truck—two-speed or all-purpose model—illustrates with pictures outstanding construction features of the truck. The hydraulic-electric truck (two-speed model is also available gasoline powered) is pictured in use. *Tow-Bear Division, Hudson-House, Inc.*

... for your copy circle No. 216



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REDUCES UTILITY COSTS...savings up to 20%
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Background information on climbers and platforms

An eight-page booklet treats an electric or air-operated lightweight climber of steel construction with a separate basket for use in painting, window cleaning, glazing, sandblasting, plastering, weatherproofing, and steel erection. Many drawings are included which illustrate construction features of the climbers, climber basket, rigging, and hooks. A notebook leaflet on circular platforms for maintenance includes specifications for both steel and aluminum types. A third booklet on electric and air-mechanical stirrups lists safety features, shows rigging, and pictures applications. *Albina Engine & Machine Works, Inc.*

... for your copy circle No. 217

16-page brochure on transfer switches

"Factors to Consider in the Selection of Automatic Transfer Switches" is a 16-page brochure in color which lists 10 features required for good design of transfer switches. Sections are devoted to capacity to withstand in-rush currents, continuous duty rating, transferring load, thermal capacity, locked designs, operation, double source control, full phase protection, time delay, and accessories. Other information includes selection of type, how to specify switch capacity, calculating line currents. (Bulletin 596) *Automatic Switch Co.*

... for your copy circle No. 218

Specifications for end-control fork truck

This six-page leaflet gives complete specifications for the Mobilift, a stand-up, end-control fork truck with automatic transmission. Pictures show the engine in detail, automatic drive, steering and turning radius, fingertip controls, and lift. Booklet also mentions briefly 12 lift attachments. (Bulletin TB-355) *Lamson Mobilift Corp.*

... for your copy circle No. 219

36-page manual on Jeffrey vibrating conveyors

Opening with special features of mechanical vibrating conveyors, this two-color manual explains design, conveyor drive, power and extension sections, and gives six steps for selecting a conveyor. Specifications are included in diagram and chart form as well as drawings showing drive arrangements, and procedure for installation. (Catalog 890) *Jeffrey Manufacturing Co.*

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Crampons prevent slipping on mountain ice, but



Pattern one-half actual size

every step is a SAFE step on low cost

A.W. SUPER-DIAMOND

ECONOMY ROLLED STEEL FLOOR PLATE

Where foot safety—with economy—is a *must*, specify A.W. SUPER-DIAMOND. Secrets of SUPER-DIAMOND's anti-slip protection are the raised diamond-shaped steel figures. Alternately spaced at right angles and correct distances, these raised figures provide safe, foot-gripping friction from any angle of approach.

SUPER-DIAMOND is tough, rolled steel floor plate—can be fabricated with ordinary shop equipment—presents no matching or waste problems—cleans and drains rapidly. Use it structurally, as an overlay or complete flooring.

No other floor plate can match A.W. SUPER-DIAMOND's safety, durability and easy maintenance at so low a cost.

A.W. SUPER-DIAMOND

ROLLED STEEL FLOOR PLATE

"The diamond in the rough... a gem of a flooring."

ALAN WOOD STEEL COMPANY
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Company

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Other products: A.W. ALGRIP Abrasive Rolled Steel Floor Plate—Plates—Sheets
—Strip—(Alloy and Special Grades)

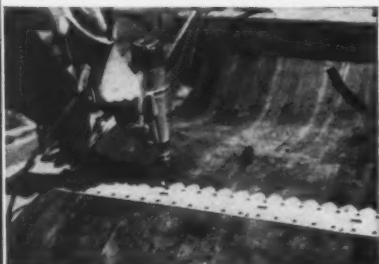
For plants where oil, water and grease raise special problems of slipping accidents, we suggest a check on the special qualities of A.W. ALGRIP... the world's only abrasive rolled steel flooring.



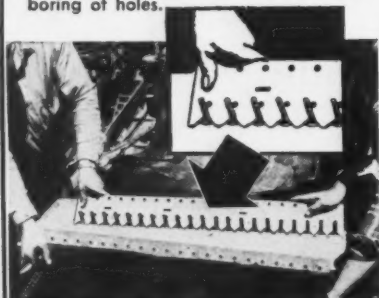
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NEW FLEXCO SPEED TOOLS CUT APPLICATION TIME IN HALF

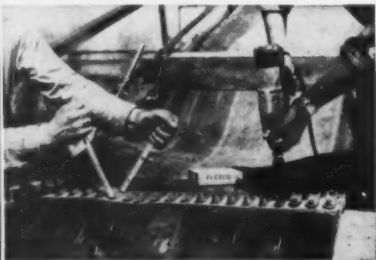
Your two man belt team can now join a belt 30" wide in 15 to 20 minutes . . . using the new FLEXCO Power Tools.



The FLEXCO Power Tool Boring Bit used with electric or air impact tool speeds boring of holes.



New FLEXCO Templet positions bolts for quick joining of belts. Reaching under belt has been eliminated.



Running down nuts is fast with the new FLEXCO Speed Wrench used with electric or air impact tool. Two Bolt Breakers are used together to complete the joint.

If you are interested in speeding up fastener application, order the new Speed Tools from your local FLEXCO Distributor. Write for Bulletin F-112-A.

FLEXIBLE STEEL LACING CO.

4642 Lexington Street • Chicago 44, Illinois

. . . for more details, circle No. 51

72

Three-color leaflet on Shellcast products

"Reduce Production Costs with ESCO Shellcast" is a 12-page booklet containing information of use to design and production engineers, purchasing agents, and other casting users on the line of ESCO Shellcast products and the firm's facilities. Included is information on reproduction detail, weight, material, dimensional tolerance, and machining of castings. Charts are included, along with ordering data. (Bulletin 205) *Electric Steel Foundry Co.*

. . . for your copy circle No. 221

36-page data book on axial fans

The Series 203 axial fans for ventilation, process air supply, and process air recirculation applications are detailed in this 36-page two-color illustrated booklet. Tube axial and vane axial flow principles are illustrated and explained, as are various arrangements possible with the axial fans. Design and construction features and recommended applications are discussed, while eight pages of selection tables and three pages of installation-type drawings conclude the booklet. (Bulletin B-1013) *American Blower Corp.*

. . . for your copy circle No. 222

Complete data on rolled steel products

A 44-page illustrated booklet covers the complete line of Bethlehem Pacific rolled steel products, giving size, weight per foot, and design properties of rounds, squares, flats, strips, etc. Also included is a commodity classification of wire, a list of fasteners, and a list of special analysis steel which the company manufactures. *Bethlehem Pacific Steel Corp.*

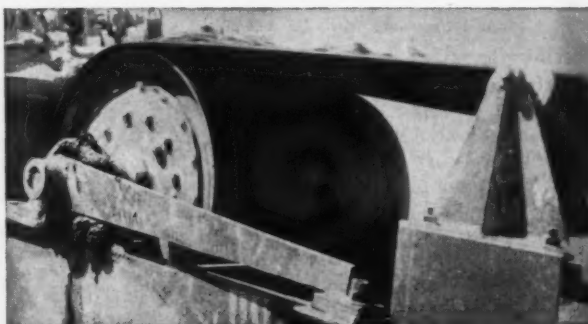
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Brochures explain ceramic coating method

The ThermoSpray process for spraying ceramic coatings at high speed is explained in a brochure which also covers coating thickness, surface preparations, suitable applications, and explains two types of powders to be used. A second brochure details the ThermoSpray gun, which permits spraying of a number of materials without the use of compressed air. The gun is pictured in action and a list of materials to be used for spraying is given. *Metallizing Engineering Co., Inc.*

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"The Head Pulley with Motor Inside." Safe, compact, simple—no chains, no belts, no sprockets, no exposed motors.



Built by Yuba for sale in Arizona, California, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah, Washington.

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IF YOU USE BELT CONVEYORS OR BUCKET ELEVATORS SAVE SPACE, CUT DOWNTIME with YUBA-SCHROCK HEAD PULLEY

All moving parts fit compactly inside pulley shell, protected against weather and dirt, thus practically eliminating pulley troubles. This pulley with motor inside requires no more

room than an idler pulley; can be installed quickly. Diameters 10½" to 56". ½ to 125 hp. for voltages to 2300. Job proved. Write TODAY for folder and name of nearest distributor.



YUBA MANUFACTURING CO.

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WESTERN INDUSTRY — July 1956

How to plan shelving to solve storage needs

Tips on how to plan installations and order shelving in more than 1,000 combinations to fit any storage or supply handling need are given in this 28-page book. Drawings of basic units and accessories, suggested floor plans, a shelf-capacity chart, and photographs of completed units make the book a useful guide to planned storage. *Hallowell Division, Standard Pressed Steel Co.*

... for your copy circle No. 225

Card explains new steel color identification system

An explanatory pocket size color card showing various colors used singly and in different combinations, explains Ryerson's new color identification system for carbon steel bars, alloy steel bars, and steel plates. In the firm's new system each color has a definite meaning: single colors identify standard carbon and carbon manganese steels; green, blue, yellow, and pink define carbon content; centered dots in carbon colors indicate heat treatment; centered dots in other than

carbon colors identify characteristics other than analysis, carbon range, or heat treated condition; purple, black, white, orange, gold, and brown designate related groups of steels, while red indicates special ground finish. *Joseph T. Ryerson & Son, Inc.*

... for your copy circle No. 226

16-page booklet on quick detachable couplers

This two-color pamphlet opens with diagrammatic layouts illustrating the application of quick detachable couplers and continues with pictures and specifications. Last sections of the booklet cover plastic hose and reusable hose fittings. *Foster Manufacturing Co., Inc.*

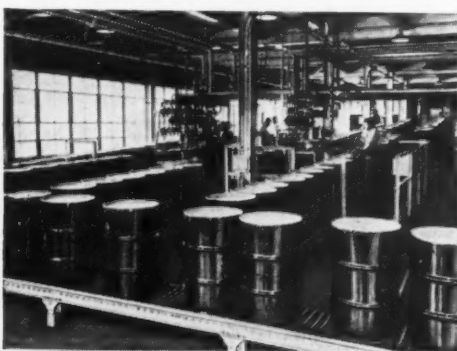
... for your copy circle No. 227

Brochure on handling service offered by Alden Equipment

A four-page brochure explains the consultation, designing, installation, and erection, servicing, and manufacturing services offered by Alden Equipment. A short recent history of the company is given along with a list of the materials handling equipment the firm handles. Pictures of different phases of the Alden operation are included. *Alden Equipment Co.*

... for your copy circle No. 228

Ask Standard how



Live Roller and Gravity Roller System handles 55 gal. drums from storage thru filling and weighing operations to shipping

to cut costs with conveyors for handling heavy, bulky commodities

STANDARD conveyor systems keep heavy, bulky commodities moving with minimum manpower and time loss. Systems can be job-tailored to solve any specific material handling problem — and to meet a wide range of requirements.

With more than 50 years of experience in conveyor application, Standard engineers are qualified to help solve your material handling problems. The Standard line of power and gravity conveyors is complete for either permanent or portable systems.

STANDARD CONVEYOR COMPANY, General Offices: N. St. Paul 9, Minnesota. Sales and Service in principal cities.

Call the Standard engineer listed in your classified phone book or write direct for Bulletin 309—address Dept. H-7.



SEATTLE: Russel G. Daley, 502 First Ave. S.
PORTLAND: 1115 N.W. Glisan St.
SAN FRANCISCO: 840 Harrison St.
LOS ANGELES: 115 E. 23rd St.

... for more details, circle No. 53 on Reader Service Postcard

July 1956 — WESTERN INDUSTRY

NEW ADJUSTABLE ELECTRIC VIBRATOR



NO WEIGHT CHANGING

A brand new silent electric vibrator that lets you vary the force of vibration without complicated weight changes, The Cleveland Vibrator Company now offers adjustable cams, permitting a change of vibrator force over a 3 to 1 range in a matter of seconds.

With this new bin vibrator you can adjust vibration to exactly fit your bins and type of material you are handling.

No problem when you use a bin for different materials; just change the weights a notch.

It's absolutely silent too.

Write for detailed information.

Air or Electric
Portable or Permanent
Silent or Standard



2914 Clinton Avenue • Cleveland 13, Ohio
7 Front Street • San Francisco 11, California

... for more details, circle No. 54

HOW TO PROTECT PIPE, PIPE JOINTS, TANKS AND COUPLINGS AGAINST CORROSION



Apply
TAPECOAT®
the Quality Coal Tar
or Asphalt Coating
in Handy Tape Form

There's no need to gamble in fighting corrosion. Since 1941, TAPECOAT has proved its ability to give lasting protection on pipe, pipe joints, couplings, conduit, cable and insulated piping—above or below ground. Its resistance to moisture, acids, alkalis, electrolysis, salt water and other severe corrosive and abrasive conditions has established TAPECOAT as the time-tested quality protection to cut maintenance and replacement costs.

TAPECOAT is made as a coal tar or an asphalt coating in handy rolls of 2", 3", 4", 6", 18" and 24" widths. It is easy to apply, using a torch to soften or bleed the pitch, and then wrapped spirally around the vulnerable surface.

For details on your specific needs, call our nearest distributor.

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Phone: Elliot 5141

R. K. BUTZ SALES
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The
TAPECOAT®
Company

Originators
of Coal Tar and
Asphalt Coatings
in
Tape Form

1563 Lyons Street
Evanston, Illinois

... for more details, circle No. 55

Data on automatic camera, private television system

This four-page leaflet on Teller & Cooper's automatic camera, which will take a picture, simultaneously record pertinent data, advance the film, and vary its own aperture opening with respect to changing light conditions, gives camera specifications, a complete explanation of how the camera works, and details applications. (Bulletin 507) A second four-page leaflet introduces a private television system for supervising plant and traffic operations, and also lists applications, and explains positioning and panning, the automatic iris control, and lenses. (Bulletin 508) Teller & Cooper, Inc.

... for your copy circle No. 229

Picture brochure on transfer conveyors

Transfer conveyors which handle all bulk materials for the short haul are detailed in this eight-page picture brochure, which contains drawings showing 11 typical uses and a short explanation of each. Special features of the conveyor are pointed out in a double-page picture. Selection data, charts giving belt widths and horsepower are included. (Manual 3000) Barber-Greene

... for your copy circle No. 230



WRITE IN FOR OUR **FREE** COMPLETE TRUCK INDEX OF RED GIANT MODELS IN OVER 600 COMBINATIONS OF SIZES AND CAPACITIES!



REVOLVATOR CO.

8798 Tonnele Ave., North Bergen, N. J.

... for more details, circle No. 56

Data on 19 types of power conveyors

Size and dimension data plus installation photographs showing conveyors in operation in different industries are included in this 24-page booklet, which discusses 19 different types of power conveyors for general industrial use. Portable, stationary, horizontal, and inclined types of power conveyors are shown, plus floor-to-floor conveyors, power belt corners, and power roller curves. Specialty items such as suspended tray type elevators, barrel, key, and sack elevators, reciprocating hoists, and steel wire mesh belt conveyors are also pictured and discussed. (Bulletin 302) Harry J. Ferguson Co.

... for your copy circle No. 231

Data on equipment for industrial waste treatment

The Cyclator and Sediflorator clarifier, both designed for treatment of industrial waste material, are covered in two 12-page bulletins. The first on the Cyclator contains flow diagrams and descriptions of many waste treatment systems involving chemical precipitation, coagulation, and sedimentation. (Bulletin 850) The Sediflorator bulletin discusses the application of flotation to industrial waste treatment. (Bulletin 6051) Inflico, Inc.

... for your copy circle No. 232

Technical handbook on casting aluminum

"Casting Aluminum" is a 130-page handbook on the design and production of aluminum castings, compiled to help the designer select the casting process and aluminum alloy best suited to meet the requirements of the product. Opening with a discussion of the important features of aluminum castings and the three most common casting methods—sand, permanent-mold, and die casting—the book explains the pig and ingot classifications used in industry and the effects of common alloying elements used with

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... for more details, circle No. 57
WESTERN INDUSTRY — July 1956

aluminum. Alloy classifications are discussed and their principal characteristics presented. Chapters are devoted to selecting the alloy, molding and coring, melting, fluxing and pouring, trimming and cleaning, heat treatment, machining and finishing, and defects, quality control, and salvage. About 25 pages are devoted to tables. For your copy write on company letterhead to *Reynolds Metals Co., 2500 So. 3rd St., Louisville, Ky.*

Notebook on 20 types of pipe tools

Included in this booklet are pictures and information on pipe wrenches, cutters, threaders, reamers, vises, chucks, extractors, shafts, supports, drives, threading machines, and many other tools. Specification charts for many of the items are included, along with a complete listing of prices. (Catalog 7596R4) *Ridge Tool Co.*

... for your copy circle No. 233

Data on enclosed induction motor

Full pages of this six-page leaflet on totally enclosed fan cooled motors of 1/2 to 25 hp., built to new NEMA standards, are devoted to the foot-mounted, flange-mounted, and face-mounted motors. Color illustrations

are accompanied by complete specifications. Included is information on stator frame, core, and windings, rotor, end brackets, fan and fan guard, bearings, terminal box, and screw threads. *Newman Industries, Inc.*

... for your copy circle No. 234

Picture sheet describes belt conveyor idlers

Link-Belt's Series 50 belt conveyor idlers in both the greaseable and factory-sealed type are described in this six-page leaflet, which pictures and discusses the construction of both types. Specifications and carts are given for the troughed belt and troughed belt training idler, and the return belt and return belt training idler. (Booklet 2516) *Link-Belt Co.*

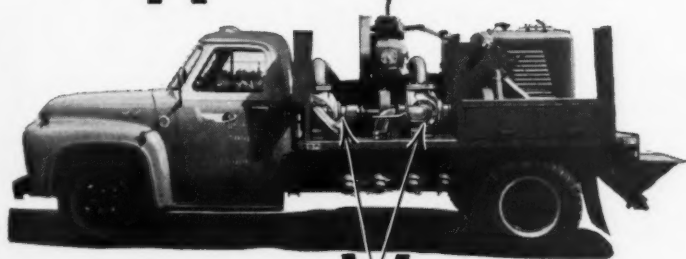
... for your copy circle No. 235

Introduction of new explosion-proof motors

Design features and maintenance tips for a new group of explosion-proof induction motors of 1 through 30 hp. for use in hazardous locations are given in this eight-page booklet. A chart tells which motors are best for particular locations while a two-page picture spread points out safety features of the motors. (Bulletin GEA-6341) *General Electric Co.*

... for your copy circle No. 236

FOR ACCURATE PUMPING



Halliburton Oil Well Cementing Company uses

VIKING PUMPS

"The fact that Viking Pumps will consistently deliver in direct proportion to their speed makes them a valuable asset to our sand proportioner units," Halliburton comments.

Used as metering pumps, Vikings deliver fluid into the mixing tank of the unit, where it is properly blended with the correct amount of sand for hydraulic

oil well fracturing service. It is the first practical design for such work, and it is made possible by accurate Viking pumping. From one to four Viking 450 G.P.M. at 260 R.P.M. pumps are used with Halliburton equipment.

If you have a problem where metering, blending or other accurate pumping of liquids is concerned, let Viking help you solve it. Write for information and Bulletin 56Sa.



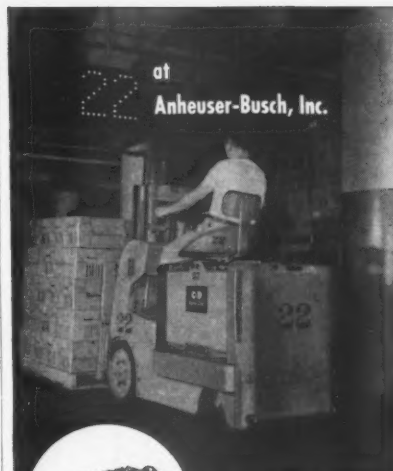
VIKING PUMP COMPANY Cedar Falls, Iowa, U.S.A.

In Canada, it's "ROTO-KING" pumps

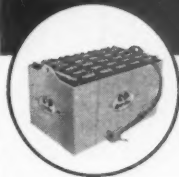
Pacific Coast Distributors: E. E. Burton, 4432 Long Beach Ave., Los Angeles 58, Calif., DeLaval Pacific Company, 201 E. Millbrae Ave., Millbrae, Calif.

... for more details, circle No. 58 on Reader Service Postcard

July 1956 — WESTERN INDUSTRY



at
Anheuser-Busch, Inc.



Lift truck at St. Louis plant runs under signal light set to flash when truck is due to come in for battery change.

C & D Batteries for EXTRA work

Anheuser-Busch, home of the famous Budweiser, is known for tradition in product—but modernization in production. At the St. Louis plant, showplace of the industry, C & D *Slyver-Clad*® batteries help keep this 'round-the-clock operation going full speed.

Anheuser-Busch employs a unique signal system for calling "due" batteries in for a "quick change" in a matter of minutes—which gives them full truck speed throughout the day.

C & D batteries are approved as standard equipment by all electric truck manufacturers. For further information, write for Catalogs.

C&D WEST COAST OFFICES

Seattle—Industrial Products Co., 2911 First Avenue, S.
Portland—Pacific Battery Mfg. Co., 427 N.E. Cook St.
San Francisco—McCormick-Morgan, 725 Second St.
Los Angeles—F. H. Pelletier Co., 1014 Venice Blvd.
La Jolla, Calif.—Frank T. Butler, 722 Fern Glen
Denver—Howard Toney, 1732 Blake St.

C & D BATTERIES, INC.

of Conshohocken, Pa.



INDUSTRIAL BATTERIES SINCE 1906



SALES AND SERVICE OFFICES IN PRINCIPAL CITIES FROM COAST TO COAST

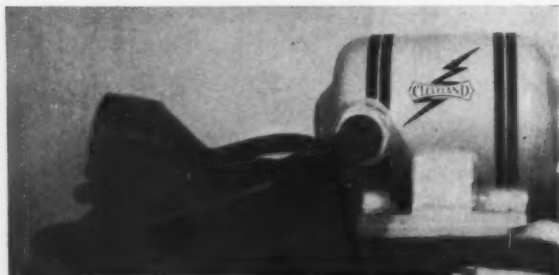
... for more details, circle No. 59

75

NEW EQUIPMENT for Western plant operation, production, and maintenance

USE RIP-OUT POST CARD, page 67, for more information on products described.

SILENT BIN VIBRATOR ... for lightweight applications



Weighing only 25 lb., this small bin vibrator, the RC-5, was designed for use on hoppers, bins, chutes, packers, and other bulk handling equipment. An outstanding feature, according to the manufacturer, is the electric vibrator's silent operation. Built on the rotating eccentric weight principle, the vibrator is available in all common voltages, a.c. It draws 100 watts, delivers a 275-lb. impact, and comes with mounting plates for either portable or permanent installation. *Cleveland Vibrator Co.*

... for more details circle No. 237 on postcard

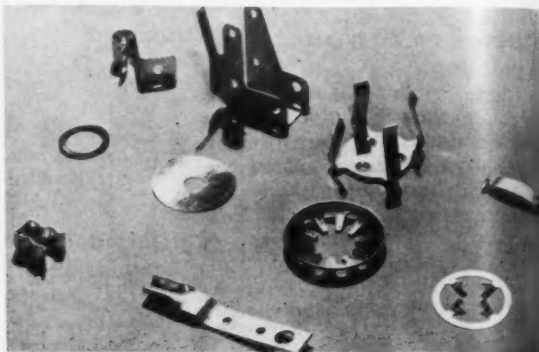
HANDS-FREE TRUCK ... with adjustable straddle bar tiller



An adjustable straddle bar tiller for steering from a standing position is a special feature of the Model N "hands-free" truck. Designed for rapid materials handling, the truck turns within a radius of 69 in. and is available in three- and four-wheel models. The enclosed, dust-sealed 1½-hp. electric motor is connected directly to the automotive differential drive; there are no belts or chains. Measuring 36 in. wide and 73 in. long, the truck has a loading deck 36 in. wide and 54 in. long with a height of 20 in. It also has self-locking brakes, six forward and six reverse speeds, and simple stop and go controls. The operator works from a treadle-type rear platform, stepping forward to drive and back to stop. *Taylor Manufacturing Co.*

... for more details circle No. 238 on postcard

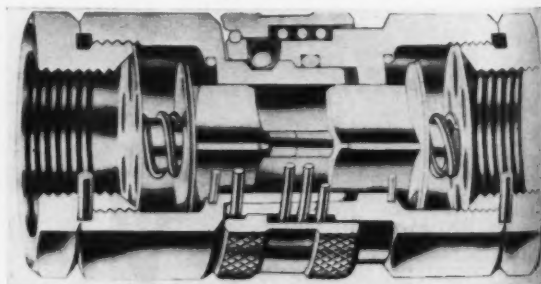
PRECISION STAMPINGS ... finished to your requirements



These precision stampings of 1075 or 1095 carbon steels—available annealed or tempered—spring brass, phosphorus bronze, aluminum, beryllium copper, or stainless steel can be finished to your requirements or to government finish specifications, heat treated as required. Available in short, experimental or pilot runs, or in larger production quantities, stampings are formed to close precision tolerances. Applications include use in aircraft, guided missiles, and electronics equipment, as well as general industrial products. *California Spring Co.*

... for more details circle No. 239 on postcard

COUPLING WITH TEFLON SEALS ... for transferring acids, solvents



This quick connect-disconnect coupling for transferring acid, alkali, solvent, or high pressure steam has Teflon nipple and valve seals. Known as the HK coupling, it will function through a —100 to a 500 deg. F. temperature range and can be subjected to lower and higher temperatures for short periods. Since there is no known solvent for Teflon, the seals will hold up during the transfer of any fluid. The coupling, made from solid bar stock, can be furnished in 303 and 316 stainless steels, brass, aluminum, special carbon steel, or in any machinable material. Available plain without valves or with automatic shut-off valves incorporated in either or both ends. It comes in ½- to 3-in. ID. pipe sizes with any type end connection desired. *Snap-Tite, Inc.*

... for more details circle No. 240 on postcard

SHUT-OFF VALVE

... for medium and high pressure pipelines



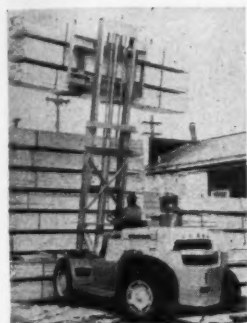
A type MA valve, available in sizes from $\frac{3}{4}$ in. to 2 in., is designed for difficult dead-end or complete shut-off service on medium and high pressure pipelines. The valve, designed to avoid sticking and clogging, does not develop a tendency to chatter or rattle, according to the manufacturer, who

tested it on pipelines with pressures up to 250 psi. Valve body is cast bronze; poppet, seat insert, pilot poppet, and pilot seat are fabricated of stainless steel; valve stem is of Monel. Piston-balanced, the valve contains a poppet that is directly operated by the valve stem, and therefore is considered full modulating. *Fulton Sylphon Division, Robertshaw-Fulton Controls Co.*

... for more details circle No. 241 on postcard

15,000-LB. FORK TRUCK

... with dual wheel drive



This 15,000-lb. capacity, dual wheel drive, pneumatic-tired fork truck is designed specifically for lumber handling and heavy outside work. The Model YL-150 has a full-load road speed of 20 mph., 30% gradeability, and a lift speed of 50 fpm. Powered with a Hercules JXC gas engine of 282-cu. in. displacement, the truck is designed so that at least 50%

of the machine's weight is on the front axle. It has 9-in. underclearance beneath the uprights. High speed power steering is standard equipment and controlled steering is accomplished with a valve which regulates the flow of hydraulic fluid from the pump to the steering booster. Outside turning radius is 160 in., while swing length is 189 in. *Industrial Truck Div., Clark Equipment Co.*

... for more details circle No. 242 on postcard

MICRODRILL

... with calibrated depth control



A calibrated micrometer depth control, employing a knurled feed ring, makes possible a positive stop of the Microdrill at exact depth required within .0002 in. Providing a means for drilling blind holes to close tolerances, it also eliminates drill breakage by regulating feed to a few thousandths of an inch or less at each pass of the drill. Collets, used

with a magnetic chuck on the Microdrill, take most available microdrills with shank sizes of .03, .04, and .06 in. This eliminates the need for special drills and does not limit the machine to any specific type of drill. A two-way table travel is provided as standard equipment on the multiple hole microdrill unit, along with an adjustable auto transformer for voltage control. *Dumore Co.*

... for more details circle No. 243 on postcard

Call

PACIFIC
SCIENTIFIC

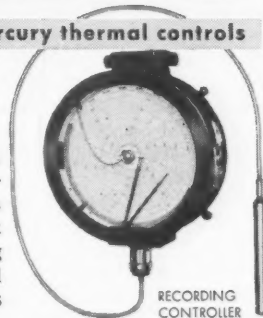
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the pioneer in mercury thermal controls

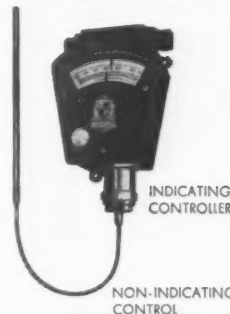
Partlow's simple, direct-acting principle of operation means they're rugged — yet reliable. Fewer moving parts for lower initial cost, longer life and less upkeep.

They're accurate ... calibrated, conservatively, to within 1% of the scale range ... for all temperature controlling jobs from -30° to 1200° F. And they're available from Pacific Scientific in recording models for a permanent record of temperatures ... indicating types for fast, accurate reading ... and non-indicating types where accurate controls are needed without visual records.

Send for the Partlow catalog giving more detailed information — write today!



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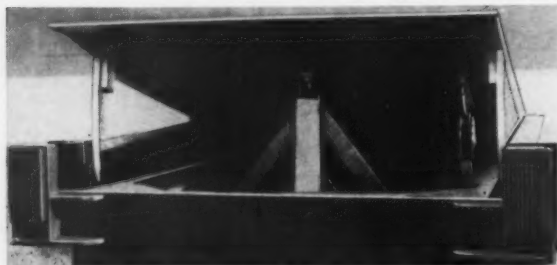
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- Testing Machine Co.
- Wilson Mechanical Instrument and Helicoid Gage Divisions of American Chain & Cable Co.

INDUSTRIAL TESTING EQUIPMENT
AND INSTRUMENTS SINCE 1919

... for more details, circle No. 60 on Reader Service Postcard

AUTOMATIC TRUCK RAMP

... requires no manual attendance



This Rite-Hite automatic truck ramp makes trucks their own ramp tenders. Completely truck-actuated, the ramp requires no manual attendance. The ramp is available in recessed and self-contained models, both incorporating precision counterbalancing and rugged design and construction. Ramps are maintenance-free as there are no chains, cables, pipes, pumps, gears, or motors. Ramp platform is actuated by the entire movable bumper assembly which can receive the impact of the truck from any angle. *Loomis Machine Co.*

... for more details circle No. 244 on postcard

DIAMOND COMPOUND

... speeds lapping operations



This lapping compound utilizes tiny diamond particles as an abrasive. Photo micrographs of the compound (above) show uniform particle shapes and blocky structure of the diamonds, two factors responsible for the compound's fast cutting speed and the bright finishes it imparts. Compound, packaged in 20 and 5 gram units, may be applied to surfaces with a gun. The diamond carrying vehicle of the compound is soluble in water or commercial solvent; it does not thin out with heat or thicken and roll up under usage. Compound may be applied to molds, punches, tools, dies, gages, rolls, bearings, and most hard, metallic materials where lapped finishes are required. *Di-Met Corp.*

... for more details circle No. 245 on postcard

NON-CORROSIVE ROLLER CHAIN

... lessens friction drag

Designed for use in industries where corrosion resistance is an important factor in the performance of roller chain, this non-corrosive electrolyzed roller chain is available in all standard American roller chain sizes and meets specification standards. The chain, stainproof as well as corrosion-resistant, has a tensile strength greater than that of stainless steel and equal to alloy chain. The coefficient of friction is lessened because electrolyzing produces a satin smooth surface. Another advantage of the chain is that it costs as much as 40% less than comparable sizes of stainless steel roller chains, according to the manufacturer. Samples are available. *Atlas Chain & Manufacturing Co.*

... for more details circle No. 246 on postcard

ALUMINUM TREAD PLATE

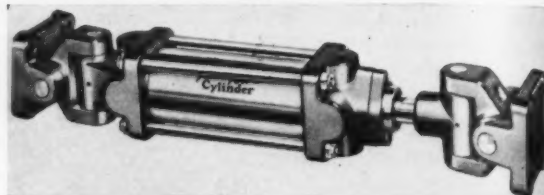
... with non-skid abrasive feature

This non-skid abrasive aluminum tread plate will provide sure footing even when it is covered with oil, grease, or water, and is designed for steps and aisles, catwalks, and truck and trailer floors. The tread plates are rolled from ingot by a method which provides a fused aluminum abrasive oxide on one surface. The layer of abrasive is metallurgically bonded to the aluminum plate. Also corrosion-resistant, the plate can be shop fabricated by such methods as shearing, sawing, punching, and drilling. *Aluminum Co. of America*

... for more details circle No. 247 on postcard

CYLINDER MOUNTINGS

... eliminate misalignment breakage



These two types of universal cylinder mountings were designed to eliminate problems due to misalignment between cylinders and their loads. Types include a hinge mount cylinder with universal mounting brackets at each end (above) and a cylinder with universal trunnion and universal mounting bracket for the rod end. Applications include operation of hopper gates, elements rotating about shafts such as gear segments and levers, and objects moving on wheels or tracks such as trucks or transfer tables. Mountings also compensate for deflection and misalignment where cylinders are connected to structures that are riveted, bolted, or welded. *Hanna Engineering Works*

... for more details circle No. 248 on postcard

SYNTHETIC LUBRICANTS

... resist atomic radiation



Synthetic lubricants that perform better when subjected to atomic radiation than under ordinary operating conditions have been developed by California Research Corp., a Standard subsidiary. Designed to function in atomic engines, the poly-type lubricants do not deteriorate when exposed to radiation, as conventional lubricants do. *Standard Oil Co. of California*

... for more details circle No. 249 on postcard

RUBBER CONVEYOR BELT

... for handling hot materials

The "Fire Curtain" belt, made with glass fabric insulation, is designed to withstand temperatures as high as 1,400 deg. F. It has two plies of glass fabric that float in the rubber cover. The glass fabric retains its strength despite intense heat, thus keeping fiery metal objects from burning through the belt. The belt has been developed for use in foundries where burnt holes are a major

cause of belt failure, but is suitable for hot material conveyor belt applications in other industries. *B. F. Goodrich Co.*
... for more details circle No. 250 on postcard

PORTABLE BELT UNIT

... handles castings, parts, pieces



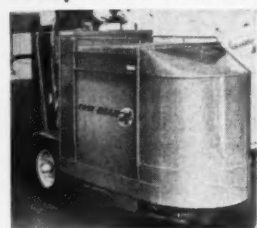
Partsbelt is a portable belt unit, built in lengths of 4, 6, and 8 ft., which will handle stampings, die-castings, plastic parts and pieces of all kinds from presses or other machines to tote boxes, bins, or continuous conveyors. Available in three widths—8, 12, and 16 in.—the conveyor can be set

level 18 or 31 in., or at slopes to 60 deg. Belt is made of three-ply, 16-oz. oil-resistant rubber and will travel 76 fpm. in one direction. *Standard Conveyor Co.*

... for more details circle No. 251 on postcard

THREE-WHEEL TRACTOR

... operated with dual controls



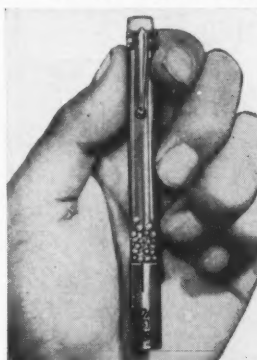
Dual controls on this three-wheel tractor permit operation while walking on either side of the unit or from the operator's platform. The all-purpose tractor, operating from 12-v. automotive or industrial batteries, will tow up to 4

tons at a set speed of 5¾ mph. Torque and speed may be altered to meet special requirements. Measuring 72 in. long and 31 in. high, the three-wheeler is hydraulic-electric operated in its entirety, while brakes are applied to the drive wheel by a reversal of hydraulic fluid. *Tow-Bear Div., Hudson House, Inc.*

... for more details circle No. 252 on postcard

RADIATION DETECTOR

... warns against gamma ray dangers



The Radad Dosimeter is an exposure radiation detector for personnel use which provides both cumulative measurement and instantaneous reading of gamma ray radiation, warning the wearer of dangerous dosage in the event of a major exposure. It consists of a hollow, hermetically sealed ionization chamber containing polystyrene beads which serve as indicators for the amount of exposure to radiation.

The indicator beads are electrostatically charged by shaking the tube. The detector is carried in the pocket or placed in a convenient location. When the dosage of radiation approaches the limit, the beads lose their charge and drop to the bottom of the chamber out of sight, below the metal ferrule. *Pacific Transducer Corp.*

... for more details circle No. 253 on postcard

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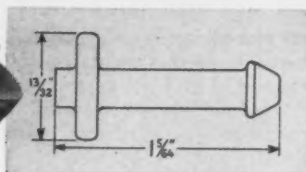
Engineering of PLASTICS for CORROSION-RESISTANT APPLICATIONS

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- Design
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- Teflon Gaskets
- Tower Packing
- Hard Rubber Pipe
- Plastic Pipe
- Plastic Rod
- Plastic Sheet
- Plastic Tubing
- Raschig Rings
- Polyethylene Tape
- Plastic Valves

... for more details, circle No. 61 on Reader Service Postcard



This cost:



SCREW MACHINE	\$14.00 per thousand
COLD HEADED	\$5.20 per thousand
SAVING	\$8.80 per thousand

How about your fasteners or small parts? Have you had an estimate from HASSALL?

This is a typical example of how HASSALL saves thousands of dollars for cost-conscious manufacturers in hundreds of industries. This part is made in one piece by cold heading . . . the part is not only lower in cost but also stronger and just as accurate. Savings amount to \$8.80 per thousand and this manufacturer used hundreds of thousands a year!

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John Hassall, Inc., Box 2186, Westbury, L. I., N. Y.

HASSALL

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MULTIPLE DRIVE SYSTEM

... provides synchronized speed changes



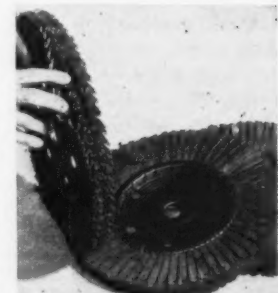
The U. S. Varidyne is a drive system of synchronized variable speed multiple drives with a power unit which interlocks motors by means of electrical impulses. By turning the control dial on the power unit the speed of every motor in the system is varied equally

and simultaneously. Motors are of the a-c squirrel-cage induction type, connected to the power unit with standard three-phase circuitry. Motors are available in speeds from 1 to 10,000 rpm. in ratios of up to 5:1. Power units will carry from 1 to 50 hp. connected load. In the Varidyne system when motors are operating in tandem, as on a single conveyor, they will equally share the load. *U. S. Electrical Motors, Inc.*

... for more details circle No. 254 on postcard

IMPREGNATED ABRASIVE BUFF

... for use on ferrous, nonferrous metals



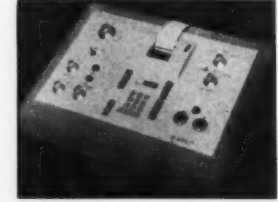
Made of specially-treated biased cloth, impregnated with selected abrasive grains bonded throughout its entire construction, this pleated-type sectional abrasive buff has been designed for all ferrous and nonferrous metals. Available in fine grit sizes for preparing surfaces for color buffing or plating, or both,

and in coarse grit sizes, the buffs can be altered by the use of spacers to adjust cutting action and to provide greater coverage. *Carborundum Co.*

... for more details circle No. 255 on postcard

NUMERICAL CONTROLLER

... gives instructions to machine tools



The Digimatic is a numerical control device for operating machine tools with digital instructions that are automatically computed and recorded on magnetic tape. It consists of two principal units—a planning

desk, the main part of which is a high-speed decimal computer and tape recorder, and a machine control unit which governs the operation of a machine tool by the instructions on the magnetic tape. The dimensions of the finished part are fed into the planning desk in sequence through a keyboard similar to that of an adding machine. After each dimension is entered, the operator presses a button marked "compute." This is a signal to the computer to take the dimensional data to convert it into the proper numerical instructions, which it records in pulse form on a magnetic tape. The machine also checks itself and warning lights flash if it has made an error. After instructions are computed and recorded, the tape is re-wound and played back to the machine control unit. From then on servomotors on the milling machine, obeying the tape-recorded instructions, move the machine's work table to form the part. *Electronic Control Systems, Inc.*

... for more details circle No. 256 on postcard

BI-DIRECTIONAL COUNTER

... adds, subtracts at 20 counts per sec.



This bi-directional magnetic pulse counting mechanism is designed primarily for use in control and data reduction applications, but may be used in counting the rotation and counter-rotation of machine shafts, or in tallying electrical impulses. The counter both adds and subtracts at speeds up to 20 counts per second, with a minimum pulse duration of 20 milliseconds and minimum dwell between pulses of 25 milliseconds. The device, which will provide a running count from two sources at once, is motivated by solenoids and a spring loaded yoke and pawl system linked to a star wheel which triggers the counter wheels. Digit wheels are linked with plastic gears. Photocon Research Products ... for more details circle No. 257 on postcard

AUTOMATIC TRAVEL TORCH

... for use on all metals

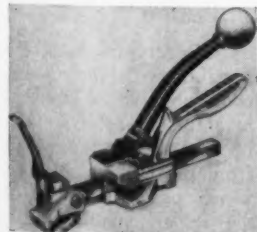


Designed for applications requiring long gouges, cuts, or bevels, this automatic travel torch may be used with ferrous and nonferrous metals. The Model L-3 is held and moved by a machine on a track, and on circumferential seams it is held in a fixture with the work rotated. Speed of travel can be predetermined and set at a constant rate. The torch will take electrodes up to $\frac{3}{8}$ in. in diameter; the Model L-5 is available for electrodes up to $\frac{5}{8}$ in. Both are designed to use only an electric arc and compressed air for cutting operations. Arcair Co.

... for more details circle No. 258 on postcard

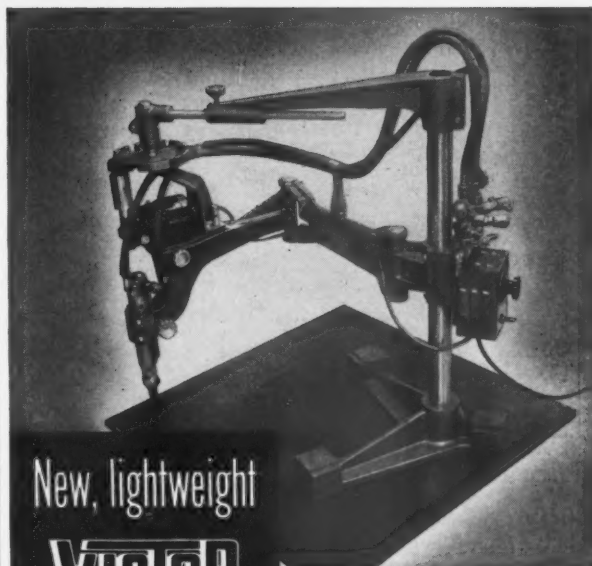
STRAPPING TOOLS

... for production line strapping



Two new strapping tools, the Stanley JET, a pneumatic strapper, and the HDX heavy-duty hand tightener (left) are available for use in production line strap applications. The tightener was designed to speed the tightening of heavy duty strap on various special production jobs having narrow surfaces, such as bundles of rod and pipe and coils of steel or wire. It utilizes a pusher-type, "duck-bill" head which has a single screw adjustment for $\frac{3}{4}$ - to $1\frac{1}{4}$ -in. strapping of various gages. Strapping is snapped off at seal by the head when the tool is pushed forward and down. The 4-lb. JET, housed in magnesium, has unlimited strap take-up, two throttles, and a motor with built-in muffler which reduces whistling. Strapping from $\frac{3}{8}$ to $\frac{3}{4}$ in., .020 gage, can be tightened to a predetermined and uniform tension by setting the air pressure regulator. Steel Strapping Division, Stanley Works

... for more details circle No. 259 on postcard



New, lightweight
VICTOR
Duplicutter

MODEL DC-2000

Portable Model DC-2000 cuts circles to $19\frac{1}{2}$ " diameter, rectangles to $12" \times 35"$, and metals to $\frac{1}{8}"$ thick. Torch accommodates all Victor 1-101 and 1-100 cutting tips, through size 5.

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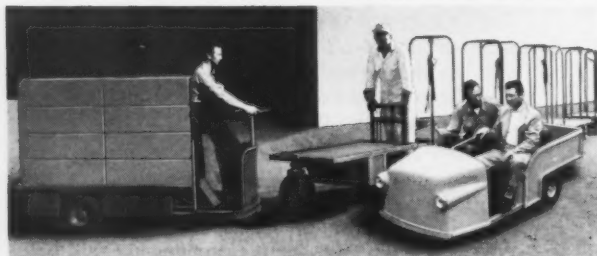


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82

1-TON MULTIPRESS

... has interlocked manual controls

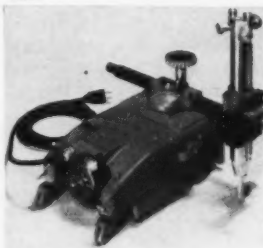


Interlocking manual controls that eliminate accidental tripping of the ram are a special feature of this 1-ton Multipress, which is designed for assembling, riveting, punching, marking, trimming, pelleting, and compacting operations. The press duplicates ram pressure with every stroke and has precision ram alignment. It also has a fast cycle and is simple to set up. The Multipress operates on 110 v., 60-cycle single phase circuit and can be wired for operation on 220-v. single phase. Ram pressure of the electrically controlled press is 500 to 2,000 lb. It will operate individually or in a production line. *Denison Engineering Co.*

... for more details circle No. 260 on postcard

MACHINE CUTTING BLOWPIPE

... cuts light-gage sheet, 8-in. slabs



A machine cutting blowpipe, designed for light-to-medium mechanized cutting, will cut metals ranging in thickness from light-gage sheet to 8-in. slabs. Blowpipe operates on medium pressure acetylene or other fuel gases, and is intended for continuous or intermittent straight-line, bevel, or circle-cutting operations in contract welding shops, manufacturing plants, and maintenance and steel fabricating shops. The position of the cutting oxygen valve at the front of the blowpipe provides operating ease, and eliminates the possibility of disturbing preheat valve adjustments. A life-time plastic valve packing assures positive, gas-tight sealing, and ease of adjustment. *Linde Air Products Co.*

... for more details circle No. 261 on postcard

SANDBLASTING MACHINE

... permits uninterrupted blasting



Uninterrupted blasting is possible with the Clemco continuous action sandblast machine, Model CA 2460, because all blasting is done from the bottom chamber, which permits refilling of the upper chamber while blasting is going on. Abrasive in the upper chamber automatically transfers to the lower chamber. The machine, a double-chamber type holding 1,000 lb. of sand with automatic pop-up filling valves and 1 1/4-in. piping, is equipped with two blast hoses working off two sand control valves. Mounted on three legs and equipped with lifting ears, the unit is designed for large scale users. If desired only one hose can be operated. *Clementina, Ltd.*

... for more details circle No. 262 on postcard

WESTERN INDUSTRY — July 1956

HEAVY-DUTY FORK LIFTS

... with rear axle steering

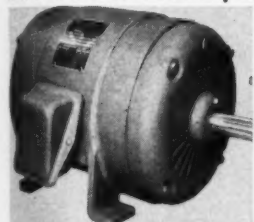


The Series M consists of four heavy-duty fork lift trucks with capacities of 12, 13, 14, and 15 tons. The trucks, with two-wheel, castor-type, rear axle steering for high maneuverability, are gasoline powered with Ford industrial engines, although diesel power is also available. Equipped with dual tired front wheel drive, the forks lift at 50 fpm. to a height of 10 ft. Forks, standardized at 48 in., are variable in width from 0 to 100 in. Gerlinger Carrier Co.

... for more details circle No. 263 on postcard

ELECTRIC MOTOR

... with extruded plastic insulation

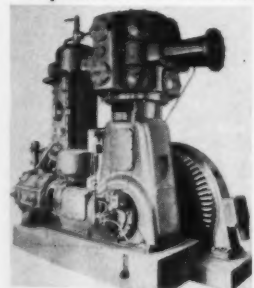


A new line of electric motors, available in sizes from 1 to 40 hp., is designed with thermo-setting extruded plastic insulation which is molded into and around the stator winding. Motor stator is placed in a die and the plastic material is forced into the die under heat and pressure. The liquid plastic resin is extruded through the stator slots, covering the stator winding. The insulation provides thermal protection by conducting heat uniformly away from every wire. Lincoln Electric Co.

... for more details circle No. 264 on postcard

HEAVY-DUTY COMPRESSORS

... provide air for hoists, tools, jigs

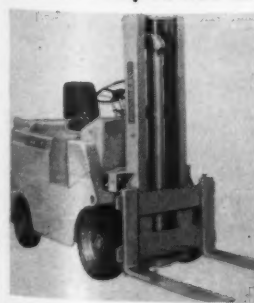


The Series AR heavy-duty compressors includes six models, ranging in size from 330 to 3,220 cfm. All are of the L-shaped, two-stage, double-acting type, fully counter balanced. Units to 800 cfm. are available steel skid-mounted to permit moving to different job sites within a plant. Especially adapted to foundry and manufacturing plant installations, compressors have low operating speeds. Atlas Copco Pacific, Inc.

... for more details circle No. 265 on postcard

FORK LIFT TRUCKS

... with capacities of 6,000 to 11,000 lb.



Four models of fork lift trucks make up the new Towmotor Pace-Maker series, which offers a range of lifting capacities from 6,000 to 11,000 lb. in gasoline, diesel, and L-P Gas powered units. Units have power steering, automatic transmission, and positive-action hydraulic systems, and "creep control." Towmotor Corp.

... for more details circle No. 266 on postcard

Oakite's FREE Booklet

"Some good things to
know about Metal Cleaning"

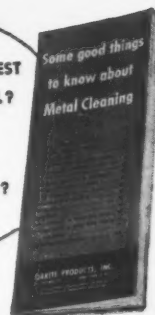
WHAT'S THE FASTEST
WAY TO CLEAN METAL?

See page 11

WHAT'S THE MOST
ECONOMICAL WAY?

See page 9

Some good things
to know about
Metal Cleaning



answers many questions that mean better production, more profit for you. Just look at the table of contents:

Tank cleaning methods	Zinc phosphate coatings
Machine cleaning methods	Paint-stripping
Electrocleaning steel	Steam-detergent cleaning
Electrocleaning nonferrous metals	Barrel finishing, burnishing
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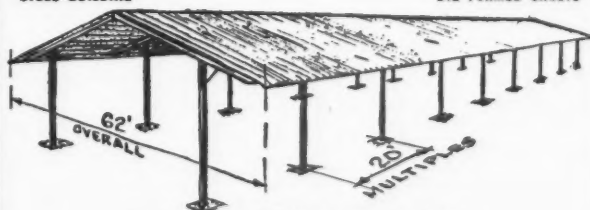
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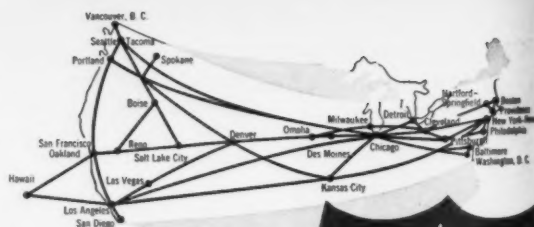
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... for more details, circle No. 69 on Reader Service Postcard
WESTERN INDUSTRY — July 1956

THE INDUSTRIAL WEST ON ITS WAY

plants • production • distribution • personnel



FIRST ANHYDROUS AMMONIA PLANT of its kind to be installed at a major steel plant in the U.S. is being built at Geneva Works near Provo, Utah, at U.S. Steel's Columbia-Geneva Div. Two giant Chicago Bridge & Iron Horton spheres are shown near completion on construction site. The big chemical plant, scheduled to be in operation late this year, will use coke oven gas from Geneva's 252 coke ovens, and have an annual capacity of 70,000 tons of anhydrous ammonia and ammonium nitrate.

GUIDELINES

● **FOUR MAJOR MOVES ON THE WESTERN CONTAINER FRONT TO INCREASE PRODUCTION:** Container Corp. of America breaks ground for **\$6,000,000 pulp mill** in Santa Clara, Calif.; Martin Bros. Box Co. acquires California Barrel; Crown Zellerbach plans **300-ton-per-day kraft bleach plant**, product lines to receive the material include food containers; Canco decides to spend **\$27,000,000** on its own **tin and steel plate processing facilities**—Oakland and Los Angeles will be Western locations.

More corrugated containers will be available from Container Corp.'s Santa Clara (next door to new pulp mill), Los Angeles, and Oakland, Calif., plants and similar facilities in Seattle, Wash., and Portland, Ore., when **new pulp mill gets into operation July 1957**. Other paper box manufacturers will also get supplies from new mill.

Strike stymie on wirebounds will be whipped: Since no real estate went with the California Barrel acquisition, Martin Bros. Box will move machinery to Oakland, Ore., and Whittier, Calif., plants—**more containers** will result from **removal of equipment** from Arcata, Calif., plant which has been strike-bound since February 1. Purchase-merger reportedly results in **greatest single manufacturing capacity in this field**.

To combat rising tin and steel plate prices, American Can will treat its own plate as received from steel companies in coil form. Reasoning by William C. Stolk, president of the can firm: "Since 1946 price of the most commonly used variety of **tin plate has increased 91%**, while Canco's price for standard **No. 2 food cans has risen only 75%**." Something's gotta give!

● **MISSILES AND ELECTRONICS STILL ON THE GO:** Interesting note in Aerojet-General's announcement that it will operate a **new \$13,000,000 government-owned rocket engine plant** near Sacramento, Calif., at site of its present similar plant—Air Force is building a **liquid oxygen and nitrogen plant** on adjacent Aerojet-General property which will produce **fuel for the rocket engines**. This plant is to be operated by Air Products, Inc., of Pa.

Douglas will build 2,000-acre missile plant—also near Sacramento, on former Aerojet property.

More fuel for the rocket-missile engines, among other uses, will come from two new Liquid Carbonic plants in the San Francisco Bay Area—a **\$1,000,000 hydrogen plant** at San Carlos and a **\$4,000,000 liquid oxygen plant**, specific site not chosen as yet.

Big ones spawn "little" ones: Fisher Research Laboratories will build an **electronics instrument plant in Sunnyvale** at a cost of better than **\$1,000,000**—one large consumer of its electronics testing and navigational equipment will be **Lockheed Aircraft's giant missile plant** on its way in Sunnyvale.

Sylvania Electric Products will add an 18,000-sq. ft. wing to its Mountain View, Calif., microwave tube laboratory.

Typical of electronics advancement in the West and up-to-date engineering practices: Beckman Instruments will build the **largest analog computer** ever assembled in the West for General Motors Allison div. in Indianapolis, Ind. Its application: design of advanced jet engines.

A need for one-roof operation of its present 11-building Redwood City, Calif., set-up has led to **Ampex Corp.'s** announcement of plans for a **\$2 to \$4,000,000 plant**. Odds are "7 to 3" for a Stanford Industrial Park location of the new electronics plant.

● **SERVICE INDUSTRIES MUST PACE WESTERN PLANT GROWTH:** Pacific Tel. and Tel. plans a **\$1,150,000 addition** to its Santa Clara, Calif., facility—**3,600 new phones** for the industrial boom-town by 1957. Just one of the services that are on the pell-mell advancement road of the industrial West.

● **MORE AND BETTER PETROLEUM PRODUCTS:** Richfield Oil is negotiating for Tulalip Indian reservation property for location of proposed **\$50,000,000 Washington refinery**; Shell Development gets approval on **\$1,125,000 improvement project** for Emeryville, Calif. **lab facilities**—14 new lab buildings and 7 offices among the list of construction jobs; Shell Oil will spend over **\$1,000,000** on **Northwestern marketing operations**—money to go into new service stations, terminals, plants, and other facilities.

News details on following pages

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... for more details, circle No. 70 on Reader Service Postcard

Container Corp. breaks ground in N. Calif.

Ground breaking ceremonies have been held in Santa Clara, Calif., for Container Corp. of America's boxboard mill and storage warehouse. The folding boxboard it will produce will serve Container Corp. carton plants in Santa Clara, Los Angeles, and Seattle, while its linerboard will go to corrugated plants in California,

Oregon, and Washington.

Scheduled for operation in July, 1957, the mill will have a top daily production of 150 tons. Located on 60 acres, it will have an operating area of 100,000 sq. ft. and a warehouse area of 32,000 sq. ft. About 110 employees for the new unit will be recruited from the Santa Clara area.

Bethlehem Pacific launches \$10 million improvement plan

An expansion and improvement program in excess of \$10,000,000 has been launched by Bethlehem Pacific Coast Steel Corp.'s shipbuilding division. Main feature of the plan involves the installation of a large floating commercial drydock to cost an estimated \$8,000,000 and be completed by the end of 1957 in San Francisco.

The drydock will have a lifting capacity of 35,000 tons, a width of 125 ft., and will be 850 ft. long. It will be able to handle large oil tankers now being built and planned for the future, which no private facilities now on the West Coast can handle.

Other features of the program include replacement of piers and a larger and more complete machine shop for marine jobs, both already underway.

Libby, McNeill plans \$2,000,000 plant expansion

Libby, McNeill & Libby, canned and frozen food producer, has announced plans for a \$2,000,000 plant expansion in Sacramento. The additions, to be located on 7 acres of land adjacent to Libby's present facilities, will provide more warehouse space and allow for expanded packing operations in the future.

Union Carbide to build uranium processing mill

Union Carbide Nuclear Co., a division of Union Carbide & Carbon Corp. of New York, has signed a contract with AEC to construct and operate a uranium processing mill at Rifle, Colo., and two new ore receiving stations and chemical upgrading plants on the Colorado Plateau. Up-

grading stations will be near Slick Rock, Colo., and Green River, Utah.

The uranium mill will be located two miles from the present Carbide Nuclear mill on the Colorado River and will have a greater capacity than the present plant.

Martin Bros. Box acquires California Barrel assets

Martin Brothers Box Co., wire-bound container manufacturer, has acquired all assets of California Barrel Co., San Francisco. Martin will transfer all California Barrel machinery and auxiliary equipment to its Oakland, Ore., and Whittier, Calif., plants. No real estate was involved.

Martin Brothers negotiated with Roddis Plywood Corp. on the acquisition as Roddis recently purchased the timber holdings and plants of California Barrel from its former owners. Roddis retains the Arcata, Calif., real estate and plant premises of California Barrel, but withdraws from wirebound manufacturing.

Fisher Research plans \$1,000,000 electronics plant

Fisher Research Laboratories, Inc., of Palo Alto, Calif., has selected Sunnyvale, Calif., as the site for its electronics instrument plant, which will cost about \$1,000,000 with equipment. The Sunnyvale operation, which will be run separately, will make electronics testing and navigational equipment for industrial use and serve the Lockheed Aircraft Corp. missile plant there.

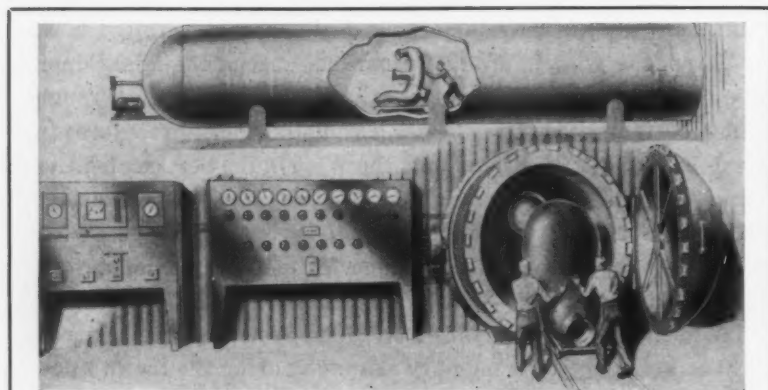
Construction on the 21-acre site will begin sometime this year.

Scott Paper Co. to spend \$1,000,000 for equipment

Some \$1,000,000 will be spent by Scott Paper Co. for additional equipment at its Everett, Wash., plant. Money will go for a drum barker, bridge crane, cutoff saws, silos for chip storage, and a structure to house the additional equipment. Scott will also purchase equipment for recovery of additional pulp fibers.

Two Air Force plants now under construction

Two Air Force plants, both located on the property of Aerojet-General Corp. near Sacramento, Calif., are under construction. Work has just begun on a \$13,000,000 facility, which will be operated by Aerojet, to manufacture liquid propellant rocket engines for guided missiles, while work



CURING OF ADHESIVES AND RESINS in fabricating large and complex aircraft and missile components will take place at high pressure and temperature ratings in Narmco Manufacturing Co.'s new 40-ft. autoclave.

Narmco installs new autoclave for adhesive curing

Narmco Manufacturing Co., La Mesa, Calif., manufacturer of structural adhesives, has completed installation of a \$125,000 autoclave, one of the largest of its kind in the Western United States. Essentially a huge pressurized oven, the autoclave provides the necessary pres-

ures and temperatures to cure adhesives and resins to structurally bond parts.

The new oven, which has an interior diameter of 8 ft. and is 40 ft. long, will heat to 500 deg. F. and temperature can be controlled to within plus or minus 5 deg. F.

on the \$4,000,000 liquid oxygen and nitrogen plant is scheduled for December completion.

The Aerojet-operated plant will have 360,000-sq. ft. and will employ about 1,000 people. The second plant, to be operated by Air Products, Inc., of Allentown, Pa., will be in limited production by August and will support the Aerojet operation. Aerojet already has a rocket engine facility of its own on the site.

Lou-Bar Products acquired by Beckman Instruments

Beckman Instruments, Inc., has acquired Lou-Bar Products, manufacturer of precision components for automatic control systems, in Santa Monica, Calif. Lou-Bar will retain its name and will be operated as a wholly-owned subsidiary of Beckman.

Beckman has also established an analog computer department for its Berkeley Division. Headed by Joseph L. Hussey, the new department will be responsible for sales, installation, field engineering and design, and development of special computer equipment.

Beckman has plans for the largest analog computer ever to be assembled West of the Mississippi. It will be used to design advanced jet engines at General Motors' Allison Division, Berkeley, Calif.

Smith Chemical moves to completed facilities

E. W. Smith Chemical Co. has moved to its newly completed facilities in Puente, Calif. The new building and grounds provide larger facilities for production and a more complete research and testing laboratory.

The water softener and treatment firm has also added equipment and personnel to provide a complete descaling service for boilers, tanks, cooling towers, and heat exchangers.



INCREASED PRODUCTION facilities and space for more complete research and testing laboratories have been gained by E. W. Smith Chemical Co., developers and distributors of industrial chemical products, since moving into its new quarters in Puente, Calif.

Canco will process its own tin plate

American Can Co. has announced plans to construct a 60,000-sq. ft. addition to its Oakland, Calif., plant to hold tin and steel plate processing equipment. The addition is part of a \$27,000,000 nationwide program for installation of new manufacturing facilities to combat rising tin and steel plate prices.

New facilities will eliminate the use of pre-cut sheets which have been used

up to now. The firm will be able to take plate from the steel companies in huge coils before it has been inspected, chemically treated, or cut into sheets. Those operations will be performed in American Can's own plants, eliminating the cost of having the steel mills perform them.

Additions at Oakland will provide employment for an additional 50 workers.

Carborundum to extend Vancouver furnace plant

A \$300,000 extension for its furnace plant in Vancouver has been announced by Carborundum Co. The addition will extend the plant 150 ft. and it will be equipped with an additional battery of electric resistance furnaces and other processing facilities.

The plant was built in 1948 and its capacity doubled in 1953. The new expansion will increase capacity by 16%. Addition will be of steel construction and similar in design to present facilities.

Sylvania plans expansion of microwave laboratory

Sylvania Electric Products, Inc., has announced plans to expand its microwave tube laboratory at Mountain View, Calif., by the addition of a new wing devoted to increased research and development in traveling-wave tubes and other microwave devices.

About 18,000 sq. ft. of space will be added to the present facility's 40,000 sq. ft. Construction will start this summer with fall occupancy planned. About 15,000 sq. ft. of the new wing will be used for engineering laboratories and offices, while the 3,000 sq. ft. will be devoted to experimental tube construction.



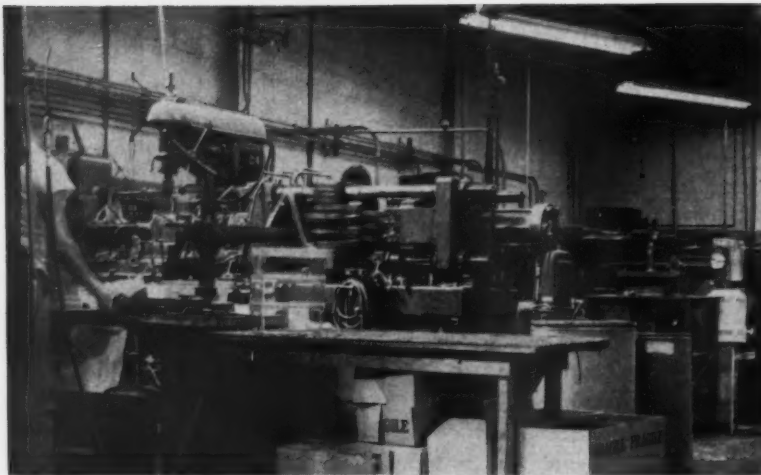
AFTER PILOT PLANT PROCESSING in the world's first pilot plant for chemical etching of steel and titanium, a part for North American's SM-64 Navaho program is measured for accuracy.

West is home of first titanium etching plant

A pilot plant for precision milling of steel and titanium by chemical etching recently went into operation at the Los Angeles facilities of Turco Products, Inc. North American Aviation's missile development division developed the pilot plant's Chem-Mill process, as it is called.

The Chem-Mill process removes unwanted metal from simple parts or complex fragile formed parts without warpage or rejection that might result from machining. The process was proved in the chemical etching of many thousands of aluminum alloy production parts.

Purpose of the pilot plant, which is now processing parts for the Air Force SM-64 Navaho guided missile, is to increase know-how in chemical etching of steel and titanium while actually turning out usable parts. The pilot plant covers 800 sq. ft. and has 500-gal. cleaning and etching tanks, as well as a drying oven.



PLASTICS PRODUCTS MOLDING PRESSES shown above are part of equipment in Pacific Plastic Product's recently expanded San Francisco plant. Heavy industrial injection molding jobs are handled on large-capacity unit at extreme left.

Pacific Plastic completes San Francisco expansion

Pacific Plastic Products, San Francisco injection molding firm, has completed a new building adjacent to its present facilities. The structure has added 14,000 sq. ft. of floor space to the firm, bringing the total to 32,000 sq. ft.

Pacific Plastic manufactures products for the fields of electronics, lighting fixtures, pharmaceuticals, cosmetics, toys, and packaging. Present employment is 40 people.

Ensign Carburetor begins \$2,000,000 Fullerton plant

Work has begun on a \$2,000,000 plant for Ensign Carburetor Co. in Fullerton, Calif. The plant will include a 20,000-sq. ft. foundry and casting room, a 6,000-sq. ft. laboratory and testing facility, and a 75,000-sq. ft. machine shop. An additional 8,000 sq. ft. will house offices.

Kimball breaks ground for San Rafael plastics building

Kimball Manufacturing Corp., a subsidiary of Bristol-Myers Co. of New York, has broken ground for a \$275,000 plant to make plastic products in San Rafael, Calif., north of San Francisco.

The 2½-acre site will house 52 employees in four steel buildings of 26,000 sq. ft. and a 4,000-sq. ft. administration building. Firm plans to move in about mid-September.

Two new San Francisco plants for Liquid Carbonic

Liquid Carbonic Corp. has announced that it will build two new chemical plants, at a cost of \$5,000,000, in the San Francisco Bay Area. The first, a \$1,000,000 million electrolytic hydrogen plant, is already under way near San Carlos, while work on the second plant is expected to begin in about 6 mos.

Permanente to complete research facility this month

Permanente Cement Co. near Los Altos, Calif., will complete a new building to house its research facilities late this month. Two sections of the firm's research program will work in the concrete block structure.

The research building is part of several expansion projects at Permanente. A kiln, the firm's sixth, will increase production by 20%. A \$12,000,000 cement plant is under construction in Lucerne Valley in Southern California, while Kaiser Gypsum Co., a Permanente subsidiary, is constructing a \$5,000,000 gypsum board plant near Antioch.

Additions planned for Reynolds Longview plant

Reynolds Metals Co. has announced plans for two additions to its Longview plant estimated at about \$850,000. To provide additional electrical facilities the rectifier station is being enlarged, and a plant for the recovery of caustic soda is being constructed.

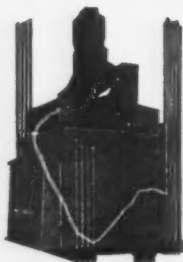
The rectifier expansion, estimated at \$700,000, will provide spare equipment to help reduce the gamble on failures and provide for additional production. The \$160,000 caustic soda plant will supply Reynolds need for caustic soda, which it has been purchasing.

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WESTERN INDUSTRY — July 1956

Swift to construct fertilizer plant

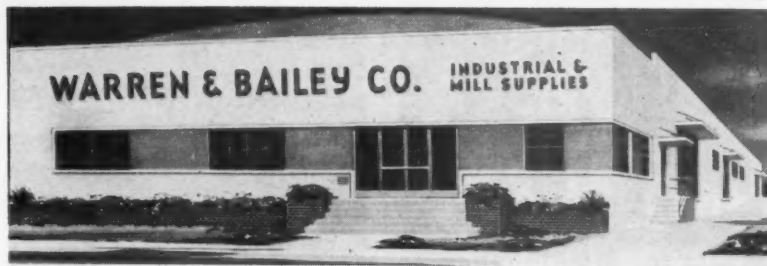
Swift & Co., Hayward, Calif., will begin construction soon on a complete liquid fertilizer plant in the Merced, Calif., industrial center. The plant will manufacture aqua ammonia, complete liquid mixed plant foods, ammonium phosphate solutions, and other solutions.

The plant will also have equipment available for applying both dry and liquid mixes and for servicing the

New stations, terminals planned by Shell Oil Co.

In a Northwest expansion move, Shell Oil Co. has announced that it will spend over \$1,000,000 during 1956 on its marketing operations in the area. The expansion will include service stations, plants, terminals, and other marketing projects. hauling and spreading equipment of customers.

New N. Calif. facility for Warren & Bailey



COMBINING BOTH WAREHOUSES AND OFFICES formerly located in San Francisco, Warren & Bailey Co.'s new \$125,000 Emeryville, Calif., plant enables the distributor firm to better serve industry in the San Francisco Bay Area.

Rohr Aircraft adding space to Chula Vista facilities

Rohr Aircraft is adding about 75,000 sq. ft. of space to its facilities in Chula Vista, Calif. Work will be completed in August on a 240 x 260-ft. building, the first floor to contain warehouse and cutting facilities, and the shipping department. A 10,000-

sq. ft. mezzanine will house training departments, some material control personnel, and production control.

Construction has just begun on a second building, a two-story structure to house kitchen and cafeteria on the first floor, and dining room on the second floor. It should be completed in October.

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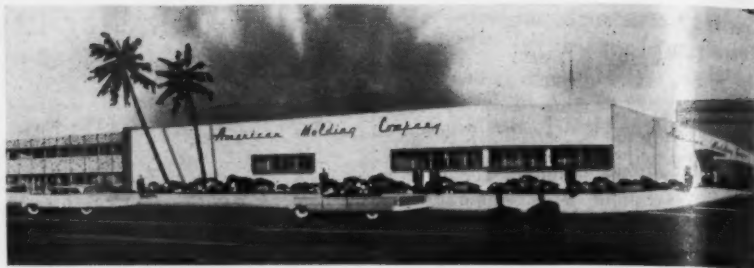
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CUSTOM PLASTIC MOLDING will be American Molding Co.'s activity in its new \$250,000 plant underway in San Leandro, Calif. Structure will cover 45,000 sq. ft. of 6-acre site.

American Molding breaks ground for San Leandro plant

American Molding Co., San Francisco custom plastics molding manufacturer, has broken ground for a new plant in San Leandro, Calif. The new building will have 45,000 sq. ft. of floor space and house administration offices, a tool room, injection, compression, and transfer molding facilities, and a warehouse.

The \$250,000 structure, which will double the firm's present capacity, is being built on a 6-acre site and is being planned for future expansion.

Liquidometer to build West Coast office

Construction will start this month on the Los Angeles engineering and sales office of Liquidometer Corp., Long Island City, N. Y., with completion scheduled for September.

The one-story building will have 4,500 sq. ft. of floor space and will be equipped with test equipment for overhaul and repair of the firm's line of industrial and aircraft liquid gaging instruments.

S&M Supply to distribute for Allis-Chalmers Mfg.

S&M Supply Co. of Grand Junction, Colo., has been named a distributor for Allis-Chalmers motors, controls, and transformers in western Colorado and eastern Utah. The supply firm, which was established in 1938, is headed by D. G. Son.

Work progressing on Axelson expansion

Steel framework construction is underway on an expansion project for Axelson Manufacturing Co., division of U. S. Industries, Inc., in Montebello, Calif. Completion is scheduled for mid-August.

Increased facilities for manufacturing aircraft landing gear and components will be housed in the new building, which will also be used to

consolidate Axelson aircraft manufacturing activities.

New building will have 110,000 sq. ft. and adjoin the present Axelson Montebello plant on its 35-acre site.

Gerlinger Carrier expanding machine shop facilities

A tilt-up type reinforced concrete machine shop, to cost \$180,000, is underway at Gerlinger Carrier Co.'s Dallas, Ore., facilities. About \$100,000 will be spent on new machine tools to equip the shop. Both projects are part of a \$500,000 expansion program.

As a result of the expansion, Gerlinger expects faster production of its heavy lift trucks and straddle carriers.

Hytronic, Bowen appointed Entron representatives

Entron, Inc., Bladensburg, Md., has appointed Hytronic Measurements Associates of Denver, Colo., to assist with sales and applied engineering for installation of Entron community television and industrial television setups in the Rocky Mountain states.

Entron also appointed R. D. Bowen Sales Co., Denver, as a representative for its new line of jobber items in the Rocky Mountain states.

New 3M supply facility for Los Angeles area

Minnesota Mining & Manufacturing Co. has opened a new sales office and warehouse in Los Angeles, Calif. The new facilities are part of a company program to provide expanded and improved services to its customers in the area.

The new building has 56,000 sq. ft. of office and warehouse space. It has space for all the firm's major product lines, including abrasives; retail, industrial, and sound recording tapes; reflective sheeting; office copying equipment and paper; printing accessories, and chemicals.

Douglas plans missile plant near Sacramento

Douglas Aircraft Co., Inc., plans to build a plant to produce products in the missile field east of Sacramento, Calif. The plant will cover 2,000 acres of land acquired from Aerojet-General Corp., which will supply architectural engineering services for the Douglas plant.

Douglas now has Western plants in Santa Monica, Long Beach, and El Segundo, Calif.

Simpson Logging begins modernization program

Simpson Logging Co., McCleary, Wash., has begun a \$925,000 modernization program at its door and plywood plant. Work now under way is a \$125,000 revamping in the cutting department, including construction of a small addition on one side.

Later the firm plans an \$800,000 program for its plywood department, an expansion which is expected to increase production by 100,000 ft. a day.

Hexcel Products plans Pleasant Hill relocation

Hexcel Products, Inc., Oakland, Calif., is planning to relocate in Pleasant Hill in a \$1,000,000 center which would be West Coast headquarters. The firm is negotiating for a 50-yr. lease on an 18-acre site.

Construction plans call for an initial 130,000-sq. ft. plant building and an additional 25,000-sq. ft. office structure. It is estimated that an additional

130,000-sq. ft. plant would be added within 5 yr.

The Pleasant Hill facilities would replace present Oakland and Berkeley plants and employ about 280 people initially.

PT&T plans to enlarge Santa Clara facilities

A \$1,150,000 addition to its Santa Clara facilities has been planned by Pacific Telephone & Telegraph Co. The project will add 3,600 new telephones to the city by fall, 1957.

The building will be a single story structure immediately behind the main telephone building and will be 83 x 67 ft. Work will start by late summer.

Ampex Corp. negotiates for Stanford Park site

Ampex Corp., Redwood City, Calif., manufacturer of magnetic tape recorders, is negotiating for a site in Stanford Industrial Park, on which it wants to build a \$2 to \$4,000,000 plant. Ampex wants to lease a 20 to 30-acre section.

Barry Controls buys U. S. Sheet Metal

Barry Controls, Inc., Watertown, Mass., has purchased the physical assets of United States Sheet Metal Products Co., Burbank, Calif. The firm will be operated as the West Coast Division of Barry and will design and produce shock and vibration mountings for aircraft and missiles.

Experimental design pays off for PIE

Currently going into service on the routes of Pacific Intermountain Express are the first of 20 new CFE dromedary trucks, manufactured by Kenworth Motor Truck



FIRST OF 20 new-design dromedary trucks to be manufactured for Pacific Intermountain Express by Kenworth Motor Truck Co. enters service on scheduled routes.

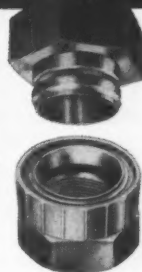
Co. of Seattle on an experimental design developed by Pacific Intermountain. According to a spokesman for PIE, special engineering features have resulted in both greater pay load capacity and increased cube, and make it possible to carry maximum pay loads with less attention necessary to load distribution.

Design features include two front axles, both of which steer; front and rear air suspension; maximum efficiency of the dromedary boxes; midships mounting of the horizontal engine; a higher-visibility windshield, and extensive use of aluminum to reduce truck weight.

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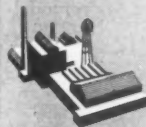


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Armstrong Rubber considering West Coast tire plant

Armstrong Rubber Co., West Haven, Conn., is contemplating a California location for a \$12,000,000 tire manufacturing plant. The firm has not decided upon a location but, according to a source close to the company, it would prefer Southern California. The plant would probably employ 1,000 persons.

Revere Copper negotiating for 80-acre Santa Ana tract

Revere Copper & Brass, Inc., is negotiating for the purchase of 80 acres of land in Santa Ana, Calif., for a new manufacturing plant. The plant would supplement Revere's Los Angeles and Riverside operations.

Initial construction plans call for a medium sized plant building with considerable expansion planned for a later date.

Richfield Oil Co. studies Tulalip site for refinery

Richfield Oil Co. has been studying 690 acres of the Tulalip Indian reservation west of Marysville, Wash., as a possible site for a new refinery. Negotiations have been undertaken with owners of the land.

The proposed \$50,000,000 refinery would be supplied with oil from an extension of the Transmountain Oil pipeline from Canada, which now ends at Anacortes.

Shell Development plans \$1,125,000 improvement

Shell Development Co., Emeryville, Calif., has announced that it has scheduled improvements totaling \$1,125,000. These include construction of 14 laboratories and seven offices, a concrete laboratory building, installation of buried tanks, and the remodeling of one building.

Apex Uranium plans ore processing mill

Apex Uranium Mines, Inc., Reno, Nev., plans to build a new mill which will be capable of processing from 100 to 150 tons of ore daily. Mill will be the only one of its kind in Nevada and will be used by other mining companies also.

New subsidiary for Aero-Coupling Corp.



TUBE FORMING MACHINE principles of operation are pointed out by Armand Laque, superintendent of operations at Aero-Coupling Corp.'s newly formed subsidiary plant for forming, brazing, and welding tubular components for aircraft and industrial plumbing.

Dow-Corning to build warehouse and office

A \$300,000 warehouse and office building of 15,600 sq. ft. will be erected shortly for Dow-Corning Corp. in Alhambra, Calif. The new facility will be the West Coast sales and distribution headquarters for 10 Western states, serving the electrical, rubber, metal, and electronics industries with silicone products. Building should be completed by December 1.

Folger Coffee constructs Dominguez facilities

Construction has started on a multi-million dollar plant for Folger Coffee Co. in Dominguez, Calif., on a 10-acre site. The plant should be in operation by late fall, 1956.

The new plant will provide coffee for Southern California, Southern Nevada, and Arizona. San Francisco will continue to serve the Northern California and Nevada areas.

Inductotherm appoints two representatives

Two new sales representatives have been appointed by Inductotherm Corp. to handle its line of induction heating metal melting equipment. Gordon Sondraker & Co. will serve the Los Angeles area, while Industrial & Foundry Supply Co., Inc., will represent the firm in San Francisco.

Lenkurt Electric to construct 48,000-sq. ft. building

Lenkurt Electric Co. of San Carlos, Calif., has announced plans for immediate construction of a new building which will add 48,000 sq. ft. of space to its present 176,000-sq. ft. office and factory facilities.

The building will incorporate an existing factory building and will be of tilt-up concrete construction with 14-ft. ceilings, radiant heating, and integral fluorescent lighting.

Pioneer Manufacturing plans \$1,000,000 Puente plant

Pioneer Manufacturing Co., Los Angeles, plans to build a \$1,000,000 plant on a 29-acre site in Puente, Calif. Construction of the 175-sq. ft. plant will start in September. Pioneer makes water heaters, garbage disposals, and house heating equipment.

Smith-Blair to build plumbing supply plant

Smith-Blair Co., South San Francisco, has announced plans to build a \$300,000 plumbing supply plant on an eight-acre site near Mountain View. Manufacturing facilities will be shifted from South San Francisco but distribution will remain the same.

The installation will have about 30,000 sq. ft. of floor area and about 60 people will be employed there.

Bovay engineering firm moves northwest office

The consulting engineering firm of H. E. Bovay, Jr., has moved its northwest office to larger quarters at 933 W. Third Ave., Spokane, Wash. Bovay serves the civil, structural, industrial, mechanical, and electrical engineering fields.

Huntington Rubber plans new Seattle plant

Huntington Rubber Mills, Inc., Seattle, Wash., plans to construct a \$120,000 plant during 1956. It will be of steel frame, prefabricated construction.

New plant will include office, factory, and boiler house buildings. Plant building, which will have a steel frame craneway, will be 100 x 222 ft.

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WESTERN INDUSTRY — July 1956

Crown Zellerbach plans new kraft bleach plant

Construction will start this summer on a new kraft bleach plant for Crown Zellerbach paper mill in Camas, Wash. The \$2,700,000 plant, which will bleach kraft pulp at a rate of 300 tons daily, will double the present kraft bleaching facilities in Camas.

The expansion, to be completed in late spring, 1957, will help the firm meet demands for tabulating cards, file folders, envelope papers, frozen food cartons, and other food containers.

International Furniture to build Corona plant

A Chicago firm, International Furniture Co., is constructing a \$500,000 branch manufacturing plant in Corona, Calif., and expects to hire about 250 people for it. Work began on the building in June.

New factory will cover about 100,000 sq. ft., double the original estimate, and International anticipates an expansion of 50,000 to 100,000 sq. ft. within a year or so after initial construction is completed.

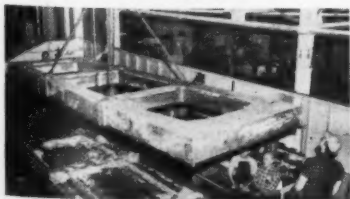
Agrochemical to build \$5,000,000 ammonia plant

Southwestern Agrochemical Corp. has announced plans to build a \$5,000,000 anhydrous ammonia fertilizer plant on a 45-acre tract near Chandler, Ariz. Plant will produce 60 tons of fertilizer daily, making a yearly total of 21,000 tons. Manufacturing is scheduled to start by the end of 1956.

Harvey Aluminum moves Bay Area offices

Harvey Aluminum has moved its Bay Area engineering offices to 2020 Milvia St., Berkeley, Calif. The firm, which fabricates wrought aluminum mill products, has its general offices and mill in Torrance, Calif.

Largest planing job



LARGEST CASTING ever planed on Boeing Aircraft's 40-ft. Gray planer in Seattle, Wash., this aluminum jig end gate casting requires 37 cu. ft. of molten metal.

Commercial packing plant scheduled by Mountain Meat

Mountain Meat Co. plans to build a \$140,000 commercial packing plant south of Kalispell, Mont. Building will have 8,877 sq. ft. of floor space and be of pumice block construction. When completed, the plant will process stock from the surrounding area.

Fuller to distribute Henry coatings, adhesives

W. P. Fuller & Co., which services more than 1,000 stores in the West, will distribute and sell the line of Henry Co. coatings and adhesives. Fuller's territory includes California, Oregon, Washington, Arizona, Nevada, Idaho, Utah, and Montana.

AEC, Atomic Fuel Extraction sign uranium plant contract

Atomic Fuel Extraction Corp. of Pocatello, Ida., and AEC have signed a contract for construction and operation by Atomic Fuel of a uranium ore processing plant at Bedrock, Colo. Construction will begin with completion scheduled for early 1957.

The processing plant will be the fifteenth in the West and will process ores from properties, owned, leased, or controlled by the corporation and those bought from independent producers in the area.

\$10,000,000 addition for PG&E Super Inch main

Work has begun on a \$10,000,000 addition to Pacific Gas & Electric Co.'s Super Inch gas main to increase out-of-state supplies. Contract calls for the installation of three sections of 34-in. steel pipe for a total of 85 miles. Work will be completed late this year.

Under other contracts which are part of the California firm's project, 6,620 hp. of additional compressor capacity will be installed, bringing the total on the Super Inch to 74,480 hp. Other compressors will also be upped in capacity.

Osbrink Manufacturing plans \$2,500,000 Hesperia plant

R. H. Osbrink Manufacturing Co. will locate the first major industrial plant in Hesperia, a new Mojave Desert community near Victorville, Calif., when it builds its \$2,500,000 facility there. The 150,000-sq. ft. plant, of tilt-up reinforced concrete construction, will employ 250 people.

The plant will be located on 28 acres of the 188-acre industrial tract. Osbrink does precision sand casting of structures in nonferrous metals.

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Bearing Engineers formed as factory representatives

Bearing Engineers, Inc., has been formed in Los Angeles to serve as direct factory representative for manufacturers of ball and roller bearings and accessory parts. The firm will serve the areas of California, Arizona, Nevada, and New Mexico.

Organized by *A. W. Wiese*, president, and *Robert R. Bloom*, secretary and treasurer, Bearing Engineers is the first representative of anti-friction bearing lines on the West Coast to handle original equipment manufacturing sales exclusively.

The new firm will offer recommendations on any job requiring the use of ball and roller bearings and related parts. Services include load calculations to determine size and type of bearing, suggesting mounting and sealing arrangements, specifying bearing fits, and advising on bearing locking methods and lubrication.

Opening ceremonies held at Canco's Salem plant

Opening ceremonies to start can production at American Can Co.'s new Salem, Ore., plant were held recently with Oregon's Governor Elmo Smith helping to throw the switches to start the containers flowing from the plant's first assembly line at a rate of 450 per min.

The new plant, for which ground was broken last January, has more than 135,000 sq. ft. of floor area. When all construction and machine installation work have been completed plant will have a rated output capacity of more than 240,000,000 containers yearly, and will employ 75 people.

Stanford Research opens So. Calif. laboratory

Stanford Research Institute has opened its new Southern California laboratories in South Pasadena. The applied research organization, which has its headquarters in Menlo Park, Calif., has consolidated its activities in Southern California.

Research at the new center will be performed in the fields of the physical sciences, economics, and engineering. The South Pasadena buildings, which formerly belonged to Beckman Instruments, have been renovated and modernized to provide more than 38,000 sq. ft. of laboratory and office space for a staff of about 100.

Pesco Products expands direct sales coverage

Pesco Products Division of Borg-Warner Corp. has opened offices in Los Angeles and Seattle to handle di-

rect sales of its fuel pumps, hydraulic pumps, and other products.

R. B. Harlan, Jr., will be manager of the Western region with offices in North Hollywood; he will be responsible for sales and servicing of Pesco products for aircraft and industry in nine Western states. *Francis C. Morris* will be senior sales engineer in charge of sales to airframe manufacturers in Southern California, while *R. H. Collier* has been appointed sales engineer in Seattle.

Maltby to distribute for Morse Chain

Edward D. Maltby Co. of Los Angeles has been appointed a distributor for the complete line of power transmission products manufactured by Morse Chain Co. in Ithaca, N. Y. Maltby, which has branches in Maywood, Long Beach, and San Diego, Calif., and Phoenix, Ariz., will handle roller and silent chain drives, flexible couplings and driveshafts, overrunning and friction clutches.

Maltby will also distribute speed reducers, gearmotors, and miter boxes made by Eberhardt Denver Co., of Denver, Colo.

Ex-Cell-O to build Downey parts plant

Ex-Cell-O Corp. of Detroit, Mich., has acquired 15 acres of land in Downey, Calif., for the construction of a 50,000-sq. ft. plant to manufacture precision aircraft parts and drill jig bushings. Ground will be broken this month and the plant is expected to be in operation before the first of the year. It will employ 150 people.

New Mexico to get first cement plant

New Mexico will get its first cement plant when Permanente Cement Co. builds its third cement plant at Scholle, about 55 miles southeast of Albuquerque. Engineering for the plant, part of a \$10,000,000 investment planned for New Mexico, will start immediately.

The Scholle plant will have a yearly capacity of 1,400,000 bbl. of cement and will increase Permanente's cement capacity to 12,400,000 bbl. annually.

Machinists to handle Diamonite cutting tools

Machinists Tool & Supply Co. of Los Angeles will handle the oxide turning and cutting tools of Diamonite Products Division of United States Ceramic Tile Co. in Canton, Ohio. Machinists Tool will stock Diamonite tools in all popular types and sizes to serve users in the Los Angeles area.

Fuller Co. to build largest Western lab

A \$500,000 research facility being built by W. P. Fuller & Co. will be the largest paint laboratory in the West. Ground has been broken for the South San Francisco facility. When the new building is completed next April, a large portion will be assigned exclusively to original research.

The two-story reinforced concrete building, with 23,000 sq. ft. of floor surface, will cover an area 80 x 140 ft. and will contain offices, library, conference and recreation rooms in addition to a series of laboratories. Seventy-five chemists, chemical engineers, and technicians will be employed in the new building, a 50% increase over the present laboratory staff.

Taylor Fibre to double La Verne plant capacity

Taylor Fibre Co. has announced a plant expansion that will double the capacity of its La Verne, Calif., plant. The expansion will include the installation of a 125-ft. treating line for impregnation of paper, glass, and cotton fabrics, as well as substantial additions to fabrication equipment.

The La Verne plant, which went into operation in 1947, manufactures laminated plastic sheets, tubing, and parts for the electronics, aircraft, and missile industries.

Thomas & Betts Co. opens Pacific division headquarters

A new building for its Pacific division headquarters has been opened by Thomas & Betts Co., New Jersey manufacturer of electrical fittings. Located in Los Angeles, the new headquarters will serve as a sales center and warehouse. It covers about 10,000 sq. ft., doubling the firm's space.

Camsco Foundry building now under construction

A 14,000-sq. ft. building is under construction in Azusa, Calif., for Camsco Foundry, Inc. The all steel rigid frame building will have a clear unobstructed span of 120 ft., one of the largest in the area.

When completed the plant and machinery will represent an investment of approximately \$250,000, and will employ 50 people.

Latex facilities to increase annual foam rubber output

Production of foam rubber will be stepped up 2,400,000 lb. yearly now that new plant facilities for American Latex Products Corp. have been completed in Hawthorne, Calif.

New machinery includes a 100-ft.

automatic drying line supplied by steam pressure boilers, which improve product quality, and a second complete conveyor system and additional facilities for fabrication, packaging, and shipping. The plant itself was increased by an additional 24,000 sq. ft.

Bucyrus-Erie Co. appoints Tractor Equipment distributor

Tractor Equipment Co. of Reno, Nev., has been appointed a distributor in western Nevada and northeastern California for Bucyrus-Erie Co. of South Milwaukee, Wis. The Reno firm will offer sales and service on Bucyrus' full line of convertible excavators and cranes, as well as the Hydrocrane, Hydrohoe, and dragline buckets.

Garrett Corp. occupies airport headquarters

An expanded \$600,000 facility has been occupied by Garrett Corp.'s Aviation Service division at Los Angeles International Airport. New headquarters is equipped with a 300 x 300-ft. hangar with four bays, each large enough to hold a four-engine airliner. This building doubles the floor area for Garrett.

Trane opens sales office in Albuquerque, N. Mex.

Trane Co., manufacturer of air conditioning, refrigeration, and heating equipment in La Crosse, Wis., has opened a sales office in Albuquerque, N. Mex. Gary Mays will be sales representative in charge of the office, which will serve as a sub-office for the Denver office of Trane.

Emmett to distribute for Oak Manufacturing

Oak Manufacturing Co. of Chicago and Chrystal Lake, Ill., has appointed the Frank A. Emmet Co., Los Angeles, as distributor for its line of gang switches and switch kits for general industrial use.

Stauffer Chemical buys 50% of S.F. Chemical

Stauffer Chemical Co. has purchased 50% interest in San Francisco Chemical Co., a mining concern in the Rocky Mountain area producing phosphate rock. San Francisco Chemical operates its own mine at Montpelier, Ida., and also mines a Stauffer-owned claim in Wyoming.

San Francisco currently supplies phosphate rock to Stauffer's phosphate

fertilizer plants in Tacoma, Wash.; Richmond and Vernon, Calif. Management in the firm will remain unchanged.

Pennsalt to replace cells at Portland, Ore., plant

Pennsylvania Salt Manufacturing Co. has announced that it will replace sodium chlorate cells at its Portland, Ore., plant. Utilizing an improved electrolytic cell developed by the firm's technical and operating personnel, the new facilities to be in operation early in 1957.

Speed-D-Burr to begin Los Angeles factory

Ground has been acquired and construction will begin shortly on a factory for Speed-D-Burr Corp. of Glendale, Calif. The \$250,000 factory will be located in Los Angeles and will triple present manufacturing facilities.

Planned for the plant are barrel finishing laboratories for experimental, customer service, and planned research into barrel finishing problems. Some 3½ acres of land have been acquired for the factory, allowing for ample trucking and parking, as well as future expansion.

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M & M Wood sold to Simpson Timber Co.

M & M Wood Working Corp. of Portland, Ore., has been sold in a \$50,000,000 transaction to Simpson Timber Co., Seattle, Wash. The purchase was effective by sale to Simpson of M & M stock.

M & M employs about 2,600 people and owns more than 2,500,000,000 board feet of timber in Oregon and California. Its plants make plywood, veneer, lumber, wooden pipe, doors.

WESTERNERS AT WORK ...

Rinshed-Mason Co.



R. E. Petersen

industrial finishes, in which the Anaheim plant specializes.

... has appointed **Russell E. Petersen** industrial sales manager of its Anaheim, Calif., plant. He has been associated with the paint industry on the West Coast for the past 10 years, and has had experience with aircraft specification finishes, can coatings, and automotive and general

Crown Zellerbach Corp.

... has made **E. W. Erickson** vice president for manufacturing and construction. He is former assistant vice president for engineering and construction at the firm's San Francisco headquarters. **Verrees Young** has become vice president and manager of mill operations for the Gaylord Container Corp. division.

General Dynamics Corp.

... has promoted two tooling executives in its Convair division in San Diego, Calif. **A. E. Hill**, former chief tool engineer, has been named works manager of Plant 1, while **R. W. Peters** has been named chief tool engineer of Plant 1. He has been assistant to Hill for the past two years.

Superior Steel Corp.

... has named **Fred C. Leeming** as Los Angeles district sales manager, succeeding his late father, **Fred E. Leeming**, who was in charge of sales activities in Los Angeles for 15 years. Fred C. Leeming has been a sales representative in the Los Angeles district for the past five years.

Magline, Inc.



G. J. Hajack

... has appointed **George J. Hajack** as Western division manager. He will headquarter in Los Angeles and be in charge of the firm's sales and service organization in the 11 Western states and Alaska. Magline, a Michigan firm, manufactures magnesium materials handling equipment.

Sperry Rand Corp.

... has appointed **Robert B. Roe** to the new position of facility planning manager for the aviation division in Phoenix, Ariz. He will direct the activities of Rand's organization of specialists in plant layout, tooling and related fields, and will supervise the construction and operation of the aviation electronics plant and flight research center in Phoenix. Roe comes to the aviation division from Sperry Gyroscope Co., another division of Sperry Rand.

SKF Industries, Inc.

... Philadelphia manufacturer of ball and roller bearings, has appointed **Richard M. Parrish** as Los Angeles district sales manager. He succeeds **William F. Weidner**, who is retiring after 35 years with the company. Parrish previously served as assistant district manager in Los Angeles. **W. Henry Keire** has been appointed field engineer in the Los Angeles district.

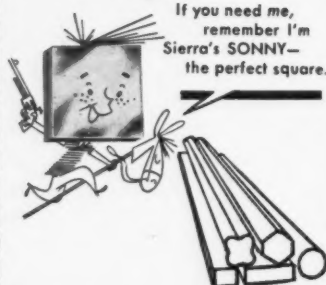
Southern Lacquer & Paint Corp.



R. W. Cresswell

... has announced that **Roger W. Cresswell** has taken over management of the sales of firm's Protekto coatings. He has had experience in the Western lacquer and paint markets, formerly serving with Arco Co. in the Los Angeles and San Francisco areas.

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Western Steel for Western Industry

... for more details, circle No. 81

Narmco, Inc.

... has appointed **William F. Amon, Jr.**, associate director of research and development for new materials. Amon has been associated with Monsanto Chemical Co. as manager of new product development and with Minnesota Mining as manager of commercial development. Amon will help strengthen Narmco's new product development and diversification program which is directed toward the chemical, aircraft, and general industrial markets.

Bethlehem Pacific Coast Steel

... has promoted **James H. Humphrey**, mill engineer at the Seattle plant, to manager of industrial fastener sales. He will be in charge of all fastener sales in the seven Western states.

McCulloch Motors Corp.

... has named **Henry D. Wood** assistant plant engineer. He joined McCulloch's plant engineering staff in 1955 and until his promotion was a project engineer in the plant engineering department.

Warner Electric Brake & Clutch Co.

... has named **Clifford Petterson** sales engineer for the Los Angeles area. He joined Warner in 1954 prior to that time he served with Fairbanks-Morse Co. and Pepsi Cola Bottling Corp. He will headquarter in Pasadena, Calif.

H. K. Porter Co.

... has appointed a new sales representative for its Leschen Wire Rope Division. **Charles L. Swinden** will cover the territory in California from Sacramento to Tulare and east of San Francisco through most of Nevada. Swinden has just completed a two months' training program with the company.

Stanley Electric Tools



W. A. Jordan

... has named **William A. Jordan** district sales manager in Southern California and Arizona. He has been Stanley's sales representative for 16 years in California, Arizona, and New Mexico, and is succeeding **Joseph C. Arend**, who has retired. Stanley Electric is a division of Stanley Works, New Britain, Conn.

Borg-Warner Corp.

... has announced that **Don Metz**, who has headed the Mid-West sales territory in Chicago for the Byron Jackson Division, will return to his former post of San Francisco regional manager of that division. **T. J. Clark** has been appointed northwest division manager of the Atkins Saw Division. He will headquarter in the Atkins Portland branch office and warehouse and will supervise sales and shipments in the northwest division.

American Can Co.

... has named **R. D. Ronketti** manager of its plant in San Jose, Calif. He was formerly assistant plant manager at the firm's Oakland, Calif., plant and is a 27-year veteran of the can manufacturing industry.

CLASSIFIED SECTION

Space is sold as advertisers' inches. All advertisements in this section are 1/4 inch short of contracted space to allow for borders and composition. Rates are \$9.00 a column inch. Copy should be sent in by the 25th of preceding month if proofs are required; by the 28th if no proofs are required.

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Enterprise Engine & Machinery Co.

... has named **J. L. Roberts**, sales engineer, to the Los Angeles branch office, where he will work with marine and contractor diesel engines. With Enterprise since 1946, Roberts has much experience in both sales and service of diesels.

Northrop Aircraft, Inc.

... has appointed **Jack Mannion**, former assistant director of quality control, as assistant to **Robert R. Miller**, vice president and general manager. Mannion joined Northrop in 1940 as an assembly line inspector and has had 20 years of experience in the aircraft industry.

Westinghouse

... has appointed **Rhule L. Bell** engineering supervisor of the Huntington Park, Calif., plant of its manufacturing and repair division. Bell was the former supervisor of switchgear and control engineering at Westinghouse's Sunnyvale, Calif., plant.

Pacific Intermountain Express Co.

... has named **E. M. Stephens** district sales manager for the Salt Lake City area. He has been with the firm's Los Angeles sales staff and also worked as sales trainer in the Oakland, Calif., office. He is a former manager of Intermountain Consolidators, Inc., a Pacific Intermountain subsidiary.

National Supply Co.

... has employed **Lester E. Carlson, Jr.**, as sales engineer of its newly established industrial sales division, which will handle sales of National's products to general industry. Carlson was formerly general sales manager of the industrial products division of Westinghouse Air Brake Co.

Ziegler Steel Service

... has appointed **Glenn Goss** superintendent of its Los Angeles plant. Goss has worked in the steel industry since 1937. New appointments to the firm's sales staff include **Jack Gray**, who will cover San Diego, Imperial, and Riverside counties, as well as the eastern portion of Los Angeles County, Calif. **Jerry Moore** will handle sales in Nevada and Arizona.

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American Potash & Chemical Corp.

... has named **Ralph Vreeland** plant process engineer at its Los Angeles plant. He will be in charge of process control and development of existing products.

Friden Calculating Machine Co.

... has appointed **W. Heath Rearwin** to replace **Reno I. Cole** as head of the methods and standards department. Cole has joined UCLA as professor of engineering. **Robert T. Magrane** has been named to head a production engineering defense project. He will replace **Frank Pruett**, who is leaving Friden.

California Spring Co., Inc.

... has named **Trevor B. Phillips** sales engineer for the southeast Los Angeles area. Before joining California Spring, Phillips was a spring design engineer at Cambria Spring Co. in Los Angeles.

White Motor Co.

... has appointed **Howard P. Strother** as manager of the Los Angeles branch of the Pacific Coast region. Strother is well known in the Western trucking industry; he has served as territory manager in Los Angeles, wholesale manager in the San Francisco regional office, and in the east.

Fred H. Ragan has succeeded Strother as San Francisco branch manager, while **Lawrence N. Lynch** has taken over Ragan's post as territory manager of the Rocky Mountain area, working from the Denver branch.

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Seattle — ELiot 6370; Phoenix — AMhurst 5-5490

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